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Reuven Lehavy
Stephen M. Ross School of Business
at the University of Michigan

Richard G. Sloan
Stephen M. Ross School of Business
at the University of Michigan

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REUVEN LEHAVY AND RICHARD G. SLOAN*

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Correspondence:
Richard G. Sloan
Ross School of Business
University of Michigan
Ann Arbor, MI 48109
Email: sloanr@umich.edu

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Investor Recognition and Stock Returns

Abstract

We analyze the relation between investor recognition and 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 results demonstrate that investor recognition is an important determinant of both stock returns and real corporate activity.

1. Introduction

We conduct an empirical analysis of the predictions of Merton's (1987) model of capital market equilibrium under incomplete information. The key behavioral assumption invoked in Merton's (1987) model is that investors only use securities that they know about in constructing their optimal portfolios. Merton demonstrates that variation in the resulting degree of 'investor recognition' of a security influences the security's equilibrium pricing. The key predictions of the 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, we show that changes in investor recognition are an important determinant of contemporaneous stock returns. Our results indicate that changes in investor recognition are even more important than news about fundamentals such as earnings in explaining contemporaneous stock returns. These results help to explain why previous research has found that news about fundamentals explains a relatively small proportion of the variation in stock returns (e.g., Roll, 1988; Lev, 1989).

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 Tamorowski'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) 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 documenting how a comprehensive measure of investor recognition can be applied to all securities in all periods. This comprehensive measure allows for an overall assessment of the importance of investor recognition in explaining the variability of security 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. 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 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 or 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 investors who are actually invested in 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. 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.

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. Since we expect these other factors to be fairly constant over time, 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 ΔBREADTH, denoting the change in the breadth of institutional ownership:

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

To capture the changes of ownership by existing filers (rather than changes in the population of 13F filers), we only include 13F filers who hold the stock in both period t and period t-1 (similar to Chen et al. 2002).

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.[1] 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 ΔBREADTH as $\Delta BREADTH_t = IN_t - OUT_t$, where IN_t (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 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

[1] 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 fails one or more of these criteria.

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'.

Tests of *P4* require measures 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 incremental 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 ΔBREADTH, we conduct our empirical tests using ΔBREADTH measured over both quarterly and annual intervals (denoted

ΔBREADTH$_{QTR}$ and ΔBREADTH$_{ANN}$ respectively). Our sample period is restricted to the 22-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. 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 ΔBREADTH using quarterly data. The mean value of ΔBREADTH 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 ΔBREADTH 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 ΔBREADTH. Table 2 provides statistics on autocorrelation in ΔBREADTH using both quarterly and annual measurement intervals. Panel A of table 2 reports the mean quarterly value of ΔBREADTH in event time for portfolios formed on the decile ranking of ΔBREADTH in event quarter t. The quarter t mean values of ΔBREADTH 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 ΔBREADTH for quarters t-1 and t+1 reveals strong evidence of positive first order autocorrelation in quarterly ΔBREADTH. 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 ΔBREADTH 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 ΔBREADTH by plotting the mean values of ΔBREADTH in event time for the extreme quarter t deciles. The figure clearly demonstrates that ΔBREADTH 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, ΔBREADTH 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 ΔBREADTH is negatively related to future returns. However, *P1* predicts that ΔBREADTH is positively related to contemporaneous returns. The combination of *P1* and positive autocorrelation in ΔBREADTH leads to the prediction of a positive unconditional relation between ΔBREADTH and future returns. The relation between ΔBREADTH and future returns is therefore predicted to be positive by *P1* and negative by *P2*. Thus, attempts to test *P2* that do not control for autocorrelation in ΔBREADTH are likely to be confounded by the conflicting predictions of *P1*. One existing study that is subject to this problem is Chen, Hong and Stein (2002). Chen et al. find that firms with positive (negative) ΔBREADTH 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 ΔBREADTH 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 ΔBREADTH when testing for the relation between current ΔBREADTH 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 ΔBREADTH 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 ΔBREADTH 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 ΔBREADTH during quarter t. The results are strongly consistent with this prediction, with returns increasing monotonically across

ΔBREADTH deciles. Returns for the lowest ΔBREADTH decile are -11.0% and returns for the highest ΔBREADTH 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 ΔBREADTH 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 ΔBREADTH and stock returns over quarters t+1 through t+3. Recall, however, that ΔBREADTH is positively autocorrelated, and these results do not control for autocorrelation in ΔBREADTH. We will provide tests of *P2* that implement such controls in section 4.3. Finally, there is evidence of a strong positive relation between ΔBREADTH 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 ΔBREADTH and returns. Consistent with *P1*, there is again evidence of a strong positive relation between ΔBREADTH and contemporaneous returns. Returns for the lowest ΔBREADTH decile are -35.8% and returns for the highest ΔBREADTH 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

ΔBREADTH on future returns are weaker in the annual data. There is also evidence of a strong positive relation between ΔBREADTH 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 ΔBREADTH 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 ΔBREADTH and contemporaneous stock returns to investor recognition instead of to cash flow news. Second, as mentioned above, there are no controls for autocorrelation in ΔBREADTH. This confounds the interpretation of tests of *P2* concerning the relation between ΔBREADTH 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 ΔBREADTH.

Table 4 provides tests of *P1* that control for cash flow news through regressions of stock returns on contemporaneous ΔBREADTH and proxies for cash flow news. For brevity, we only present these results using quarterly data. Following Liu and Thomas (2000), we use reported earnings and changes in sell-side analysts' forecasts of future earnings to proxy for cash flow news. Liu and Thomas demonstrate that incorporating information from contemporaneous unexpected earnings as well as changes in analysts' expectations of future earnings provides an effective proxy for cash flow news. Since analysts' forecasts are only available for a subset of our observations, we present our results in two panels. Panel A of table 4 presents results for the complete sample using reported earnings. We follow previous research in using seasonally differenced quarterly earnings for both the current and most recent quarter as the proxy for cash flow news (e.g., Foster, 1977). We include both the current quarter and the prior quarter because we measure stock returns over fiscal quarter intervals. During a fiscal quarter, earnings for the previous 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 lagged unexpected quarterly earnings metrics to load with positive coefficients. Panel B presents results for the subsample of firms for which we have analysts' forecasts. For this sample we use both the earnings surprise announced during quarter t (Forecast Error)[2] and the change in the consensus analyst forecast of annual earnings per share between the beginning and the end of the quarter t (Annual Forecast Revision) to proxy for cash flow news. All cash flow news proxies are measured on a per share basis and deflated by price at the beginning of the quarter.

The results in panels A and B confirm that the explanatory power of ΔBREADTH 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 ΔBREADTH. The reported results are based on the time series means

[2] Forecast error is computed as reported earnings per share during the quarter less the consensus analyst forecast of earnings per share at the beginning of the quarter. Note that since earnings are announced several days after the end of the quarter, the earnings surprise announced during quarter t will relate to earnings for quarter t-1.

of cross-sectional regressions by quarter, with t-statistics adjusted using the Newey-West correction. Consistent with *P1* and the results in table 4, ΔBREADTH is positive and highly significant in both panels. 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 ΔBREADTH and our cash flow proxies. All variables remain of approximately the same magnitudes and significance levels as in the earlier regressions. These results confirm that the relation between ΔBREADTH and contemporaneous stock returns does not arise because ΔBREADTH 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^2s indicate that investor recognition is even more important than cash flow news in explaining contemporaneous stock returns. In particular, the regressions in panel B indicate that investor recognition explains 9.3% of the variation in contemporaneous quarterly returns, while cash flow news explains only 4.6%.

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 ΔBREADTH. 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. 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 ΔBREADTH deciles into two equal halves based on rank i-risk. Thus, for each ΔBREADTH 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 in the context of *P1*. We test *P3* in the context of *P2* 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 ΔBREADTH and future size-adjusted stock returns.[3] We have already seen

[3] 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 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*. Further, as discussed earlier in the paper, the alternative of testing this prediction using a levels specification involves a major omitted variables problem.

preliminary evidence relating to this prediction in table 3. Recall that the results in table 3 reveal that the unconditional relation between ΔBREADTH 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 ΔBREADTH. 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 ΔBREADTH, period t ΔBREADTH and period t-1 ΔBREADTH. Recall that *P2* predicts that there will be a negative relation between $\Delta BREADTH_t$ and future stock returns. We therefore predict that ΔBREADTH for period t will load with a negative coefficient. We include ΔBREADTH for periods t-1 and t+1 to control for autocorrelation in ΔBREADTH. In order to illustrate the importance of controlling for autocorrelation, the first column of table 5 reports results from simple regressions of period t+1 returns on period t ΔBREADTH. Without controls for autocorrelation, the coefficient on ΔBREADTH 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. The second column adds ΔBREADTH for periods t-1 and t+1 to the regression. Consistent with *P1*, ΔBREADTH for period t+1 loads with a significantly positive coefficient. Moreover, consistent with *P2*, ΔBREADTH 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 ΔBREADTH in tests of *P2*. These results lead us to conclude that the results in Chen et al. (2002) are likely to be driven by autocorrelation in ΔBREADTH 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 this *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 $\Delta BREADTH_{t-1}$, $\Delta BREADTH_{t}$ and $\Delta BREADTH_{t+1}$.[4] *P3* predicts that the coefficient on the $\Delta BREADTH_{t+1}$ interaction will be positive (relating to *P1*) and the coefficient on the $\Delta BREADTH_{t}$ 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 4, the coefficient on the interactive term "$\Delta Breadth_{QTRt} \cdot Rank\ i\text{-}risk_{QTRt}$" 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 $\Delta Breadth_{QTRt}$ 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 $\Delta Breadth_{QTRt}$ is highly dependent on Rank i-risk. For example, the lowest Rank i-risk decile has an implied $\Delta Breadth_{QTRt}$ coefficient of -1.100+0.5·2.341=0.070, while the highest Rank i-risk decile has an implied $\Delta Breadth_{QTRt}$

[4] 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 -1.100-0.5·2.341=-2.271. The results for the annual regressions in panel B of table 5 indicate that the coefficient on the interactive term "$\Delta Breadth_{ANNt} \cdot Rank\ i\text{-}risk_{ANNt}$" 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 ΔBREADTH 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 ΔBREADTH will be approximately zero, indicating that a change in ΔBREADTH 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 ΔBREADTH will be approximately -5. This means that an increase in ΔBREADTH 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 ΔBREADTH 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 ΔBREADTH 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 ΔBREADTH 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 ΔBREADTH 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 IN_t measures new investors opening a position in the stock during period t and 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 ΔBREADTH and expected returns is driven by the IN component of ΔBREADTH. Chen et al. regress future stock returns on IN and OUT and find that the coefficients that 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 $\Delta BREADTH_t$ and future returns results from autocorrelation in $\Delta BREADTH_t$. Recall from figure 1 that mean reversion in ΔBREADTH is approximately symmetrical for positive and negative innovations. Thus, if positive autocorrelation in ΔBREADTH is driving the positive unconditional relation between ΔBREADTH 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 ΔBREADTH, the negative relation between ΔBREADTH and future returns will be primarily attributable to IN as opposed to OUT.

Table 6 begins by reporting regressions similar to those in Chen at al. The first column reports regressions of future returns on IN and OUT without controlling for autocorrelation in ΔBREADTH. 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 ΔBREADTH 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 ΔBREADTH, there is a significantly negative coefficient on $\Delta BREADTH_t$ using both quarterly and annual data. The results in table 6 show that this negative coefficient is entirely attributable to IN_t. IN_t is negative and highly significant in both the quarterly and annual regressions, while OUT_t is insignificant. Furthermore, the positive coefficient on $\Delta BREADTH_{t+1}$ from table 5 is much stronger for IN_{t+1} than for OUT_{t+1} (note that the sign of the coefficient on OUT is reversed relative to that on ΔBREADTH, because ΔBREADTH=IN-OUT). In other words, the positive association between ΔBREADTH and contemporaneous returns is much stronger for IN than for OUT and the negative relation between ΔBREADTH 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 ΔBREADTH. 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 ΔBREADTH 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 ΔBREADTH 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 ΔBREADTH in both the quarterly and annual data. Using quarterly (annual) data, the spread in financing between the high and low ΔBREADTH portfolios 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 evidence that ΔBREADTH is positively related to financing for up to two years in the future, but the contemporaneous relation is the strongest. Thus, the evidence suggests that managers respond very quickly to changes in investor recognition by immediately raising new financing.

Panel B of table 7 reports similar results to panel A 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 ΔBREADTH and investment is somewhat weaker than it was for financing. Using quarterly (annual) data, the spread in investment between the high and low ΔBREADTH portfolios is 0.40% (2.70%) with a corresponding t-statistic of 16.3 (32.3). Second, there is much stronger evidence of a positive relation between ΔBREADTH and future changes in investment. The annual data indicates that the positive relation between ΔBREADTH and investment is strongest in the year following the ΔBREADTH ranking year and is still significant 3 years after the ranking year. The general picture that emerges from panels A and B 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 result is intuitively appealing, since it indicates that firms take full advantage of their lower cost of capital by raising enough 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 ΔBREADTH, which is itself a noisy proxy for investor recognition. It is unreasonable to expect ΔBREADTH 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.[5]

[5] In unreported empirical tests, we find that ΔBREADTH, investment and external financing each have incremental explanatory power with respect to future returns.

5. Conclusions

This paper analyzes the relation between investor recognition and future 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 cash flow news in explaining security returns. Explicit consideration of investor recognition should allow for the refinement of future research in this area.

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 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 higher accruals and lower expected returns. As a second example, Jegadeesh and Titman (1993) show that stock returns are positively autotcorrelated 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 perhaps firms that are 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 ΔBREADTH 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 on 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 Tamorowksi's (2000) claim that investor relations activities are an important determinant of stock price.

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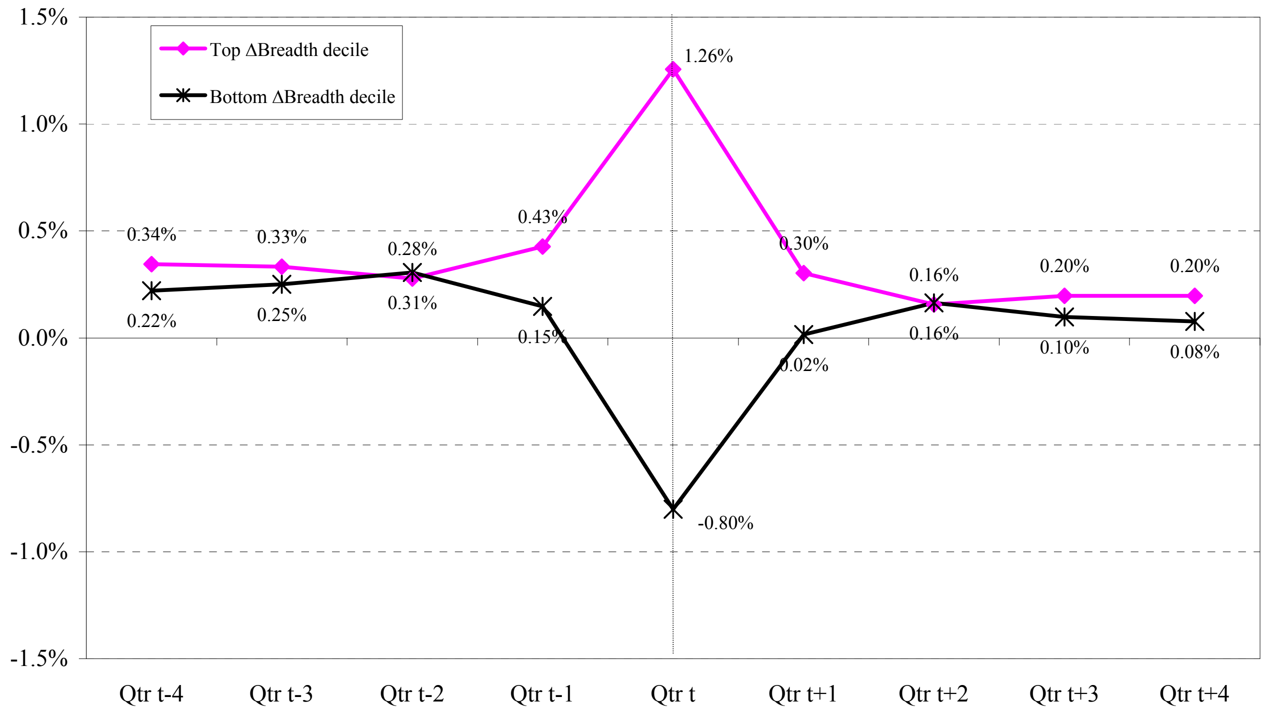
Figure 1
Mean Reversion in the Change in Investor Recognition

Panel A depicts the average values of $\Delta Breadth_{QTR}$ for the top and bottom quarter *t* decile rankings of $\Delta Breadth_{QTR}$ in quarters *t-4* to *t+4*. Panel B depicts the average values of $\Delta Breadth_{ANN}$ for the top and bottom quarter *t* decile rankings of $\Delta Breadth_{ANN}$ in years *t-3* to *t+3*. Percentage quarterly change in breadth ($\Delta Breadth_{QTR}$) 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 ($\Delta Breadth_{ANN}$) 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 reversion in quarterly change in investor recognition ($\Delta Breadth_{QTR}$)



Panel B: Mean reversion in annual change in investor recognition ($\Delta Breadth_{ANN}$)

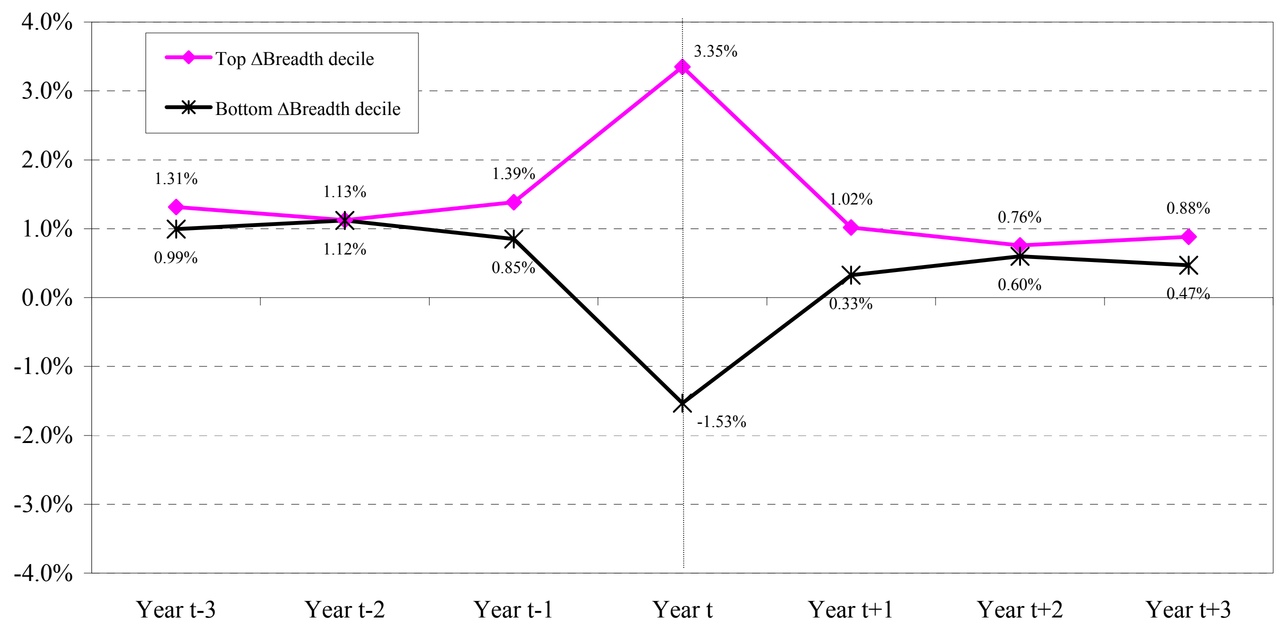
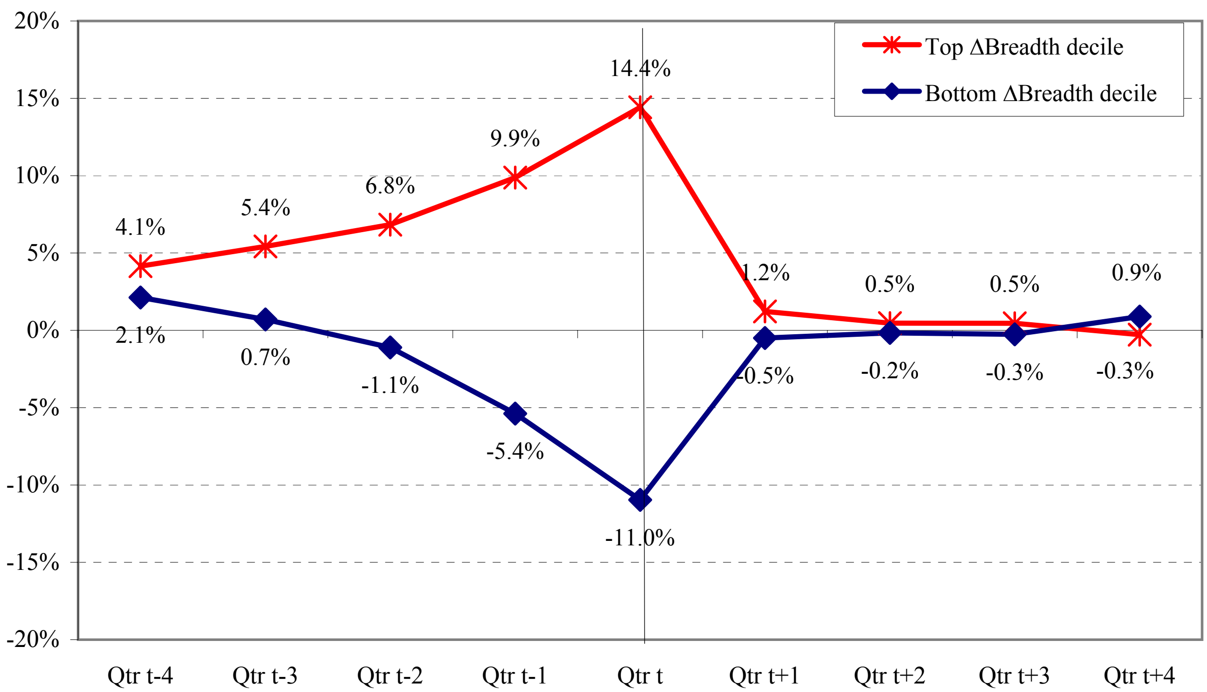


Figure 2
Quarterly and Annual Size-Adjusted Returns for the Highest and Lowest Decile Rankings of the Change Investor Recognition

Panel A depicts the average quarterly size-adjusted returns for the top and bottom quarter-t decile rankings of $\Delta Breadth_{QTR}$ 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 $\Delta Breadth_{ANN}$ 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 (ΔBreadthQTR) 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 (ΔBreadthANN) 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 $\Delta Breadth_{QTR}$



Panel B: Annual returns for highest and lowest decile rankings of $\Delta Breadth_{ANN}$

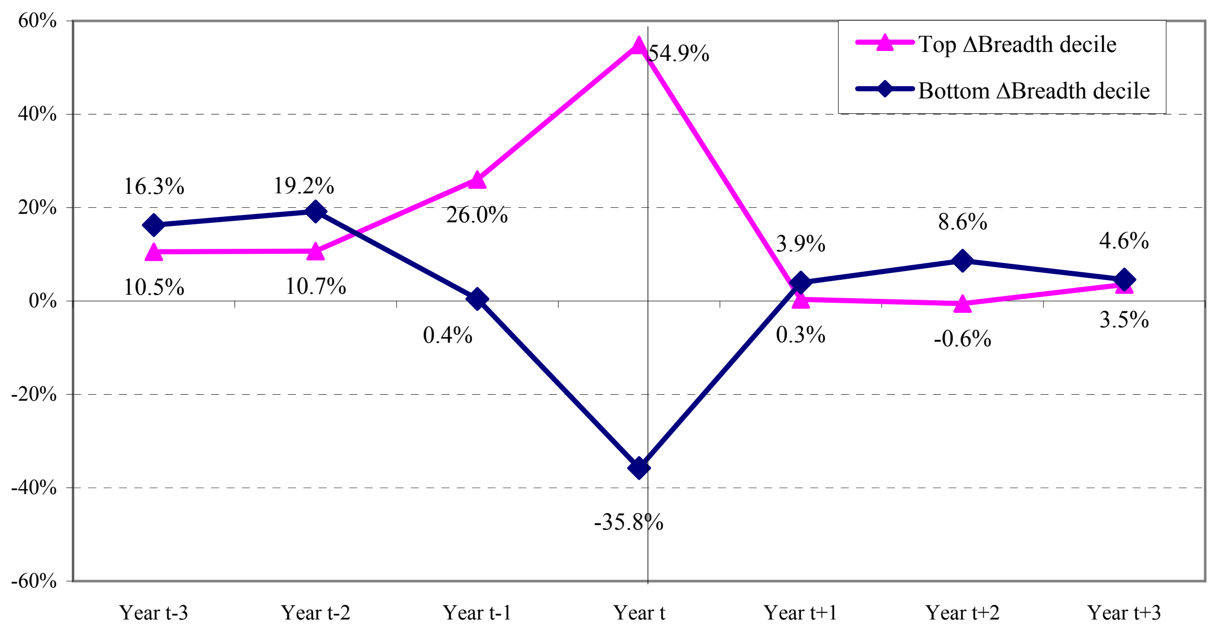
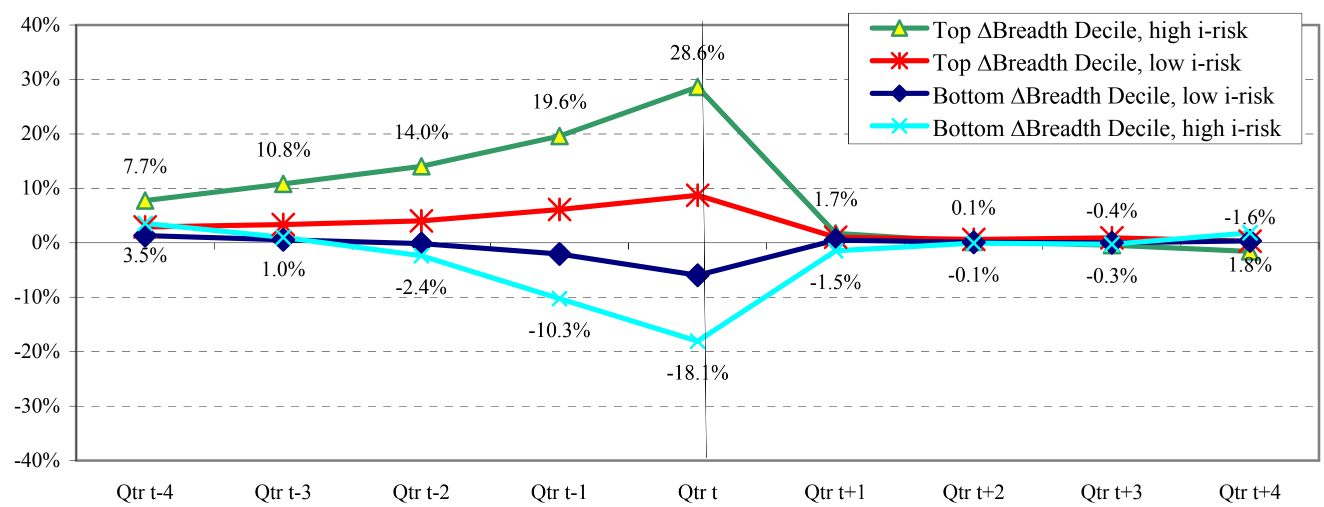


Figure 3

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 $\Delta Breadth_{QTR}$ 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 $\Delta Breadth_{ANN}$ 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 ($\Delta Breadth_{QTR}$) 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 ($\Delta Breadth_{ANN}$) 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

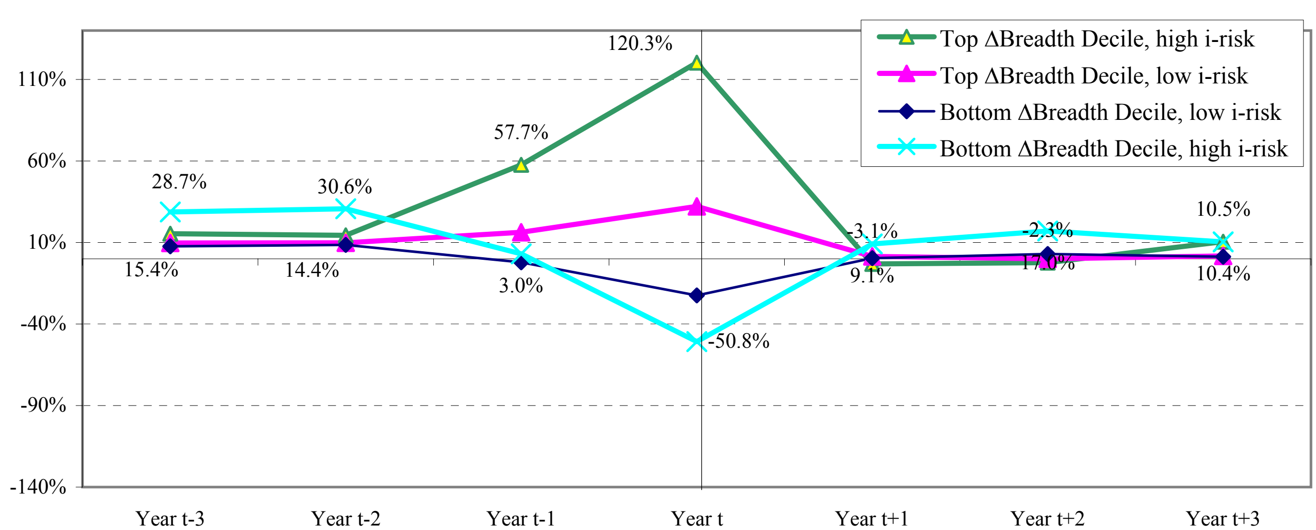


Table 1
Descriptive Statistics for Quarterly and Annual Change in Investor Recognition

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 ($\Delta Breadth_{QTR}$) 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 ($\Delta Breadth_{ANN}$) 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 ($\Delta Breadth_{QTR}$)

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 ($\Delta Breadth_{ANN}$)

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 $\Delta Breadth_{QTR}$ in quarters *t-4* to *t+4* by decile rankings of current quarter $\Delta Breadth_{QTR}$. Panel B reports averages of $\Delta Breadth_{ANN}$ from years *t-3* to *t+3* by decile rankings of current quarter $\Delta Breadth_{ANN}$. Panels C and D provides Pearson and Spearman correlation coefficients for quarterly and annual changes in investor recognition, respectively. Percentage quarterly change in breadth ($\Delta Breadth_{QTR}$) 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 ($\Delta Breadth_{ANN}$) 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 $\Delta Breadth_{QTR}$	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%	**-0.80%**	0.02%	0.16%	0.10%	0.08%
2	0.07%	0.09%	0.11%	0.07%	**-0.22%**	0.07%	0.10%	0.07%	0.06%
3	0.05%	0.05%	0.06%	0.05%	**-0.11%**	0.05%	0.06%	0.05%	0.06%
4	0.04%	0.03%	0.04%	0.02%	**-0.04%**	0.05%	0.05%	0.04%	0.03%
5	0.03%	0.03%	0.04%	0.04%	**0.00%**	0.04%	0.04%	0.03%	0.05%
6	0.04%	0.04%	0.01%	0.03%	**0.03%**	0.03%	0.04%	0.05%	0.03%
7	0.04%	0.04%	0.04%	0.03%	**0.11%**	0.04%	0.04%	0.04%	0.06%
8	0.07%	0.08%	0.05%	0.05%	**0.18%**	0.06%	0.06%	0.08%	0.08%
9	0.15%	0.13%	0.11%	0.13%	**0.38%**	0.13%	0.09%	0.11%	0.12%
Highest	0.34%	0.33%	0.28%	0.43%	**1.26%**	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 $\Delta Breadth_{ANN}$	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%	**-1.53%**	0.33%	0.60%	0.47%
2	0.36%	0.36%	0.29%	**-0.37%**	0.28%	0.34%	0.28%
3	0.20%	0.19%	0.16%	**-0.15%**	0.19%	0.23%	0.21%
4	0.15%	0.14%	0.12%	**-0.03%**	0.18%	0.19%	0.18%
5	0.14%	0.13%	0.09%	**0.05%**	0.16%	0.17%	0.17%
6	0.18%	0.15%	0.13%	**0.16%**	0.20%	0.22%	0.22%
7	0.25%	0.21%	0.18%	**0.29%**	0.25%	0.25%	0.27%
8	0.39%	0.35%	0.33%	**0.54%**	0.37%	0.35%	0.37%
9	0.66%	0.60%	0.63%	**1.16%**	0.61%	0.52%	0.57%
Highest	1.31%	1.13%	1.39%	**3.35%**	1.02%	0.76%	0.88%

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

	$\Delta Breadth_{Qtr\ t}$	$\Delta Breadth_{Qtr\ t+1}$	$\Delta Breadth_{Qtr\ t+2}$	$\Delta Breadth_{Qtr\ t+3}$	$\Delta Breadth_{Qtr\ t+4}$
$\Delta Breadth_{Qtr\ t}$		11.54%	-4.42%	4.45%	7.80%
$\Delta Breadth_{Qtr\ t+1}$	6.78%		12.09%	-6.02%	4.81%
$\Delta Breadth_{Qtr\ t+2}$	-0.73%	6.90%		12.34%	-6.59%
$\Delta Breadth_{Qtr\ t+3}$	4.00%	-0.89%	6.88%		12.09%
$\Delta Breadth_{Qtr\ t+4}$	4.52%	4.00%	-1.04%	6.72%	

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

	$\Delta Breadth_{Yr\ t}$	$\Delta Breadth_{Yr\ t+1}$	$\Delta Breadth_{Yr\ t+2}$	$\Delta Breadth_{Yr\ t+3}$
$\Delta Breadth_{Yr\ t}$		16.72%	4.75%	10.79%
$\Delta Breadth_{Yr\ t+1}$	10.67%		17.90%	4.70%
$\Delta Breadth_{Yr\ t+2}$	5.09%	11.10%		17.98%
$\Delta Breadth_{Yr\ t+3}$	9.08%	5.29%	11.13%	

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

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

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

Table 4

Regression Analysis of Quarterly Size-Adjusted Returns on Change in Investor Recognition, Earnings Surprise, and Idiosyncratic Risk

This table reports mean coefficient estimates and *t*-statistics from quarterly regressions of quarterly size-adjusted returns on $\Delta \text{Breadth}_{QTRt}$, ranks of idiosyncratic risk, current and prior seasonal change in reported earnings (Panel A) and analyst forecast errors and forecast revisions reported during the calendar quarter (panel B). Data availability reduced the sample to 80 quarters (1985Q1 to 2004Q4). Percentage quarterly change in breadth ($\Delta \text{Breadth}_{QTR}$) 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. Quarterly idiosyncratic risk is the square root of the sum over the prior 3 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. Change in earnings is computed as the seasonal change in 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. Annual forecast revision equals the change in the consensus annual earnings forecast between the beginning and the end of the quarter, scaled by price at the beginning of the quarter. Quarterly size-adjusted return is computed as the difference between the return on a firm's size decile portfolio return and the return for the firm during the quarter. 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	-0.005	0.005	-0.004	-0.005
	-1.4	1.6	-1.1	-1.6
$\Delta \text{Breadth}_{Qtr\ t}$	8.041		7.742	12.504
	14.3		14.2	22.6
Rank $\text{i-risk}_{Qtr\ t}$				0.035
				1.6
$\Delta \text{Breadth}_{Qtr\ t} \cdot$ rank $\text{i-risk}_{Qtr\ t}$				24.502
				17.5
$\Delta \text{Earnings}_{Qtr\ t-1}$		0.601	0.550	0.520
		10.2	9.9	10.2
$\Delta \text{Earnings}_{Qtr\ t}$		0.238	0.222	0.187
		6.1	6.0	5.3
R^2	4.4%	2.2%	6.3%	12.0%
Average quarterly N	2,257	2,257	2,257	2,257

Panel B: Regressions using forecast errors and forecast revisions to measure cash-flow news

	(1)	(2)	(3)	(4)
Intercept	-0.006	0.017	0.004	0.009
	-1.6	6.7	1.0	2.1
$\Delta \text{Breadth}_{Qtr\ t}$	8.847		8.202	11.368
	15.0		14.2	18.1
Rank $\text{i-risk}_{Qtr\ t}$				0.029
				1.2
$\Delta \text{Breadth}_{Qtr\ t} \cdot$ rank $\text{i-risk}_{Qtr\ t}$				20.552
				13.6
Forecast $\text{Errors}_{Qtr\ t}$		1.043	0.924	0.912
		9.1	8.8	9.0
Annual Forecast $\text{Revision}_{Qtr\ t}$		1.787	1.320	1.228
		18.4	15.0	15.9
R^2	9.3%	4.6%	12.3%	20.4%
Average quarterly N	2,076	2,076	2,076	2,076

Table 5

Regression Analysis of Future Size-Adjusted Returns on Prior, Current, and Future Measures of 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). Percentage quarterly change in breadth ($\Delta Breadth_{QTR}$) 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. 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. Percentage quarterly change in breadth ($\Delta Breadth_{QTR}$) 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 ($\Delta Breadth_{ANN}$) 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

Intercept	0.001	-0.005	-0.004
	0.6	-1.7	-1.4
$\Delta Breadth_{QTR\ t-1}$		-0.029	-0.121
		-0.2	-0.7
$\Delta Breadth_{QTR\ t}$	0.375	-0.989	-1.100
	1.4	-3.2	-3.4
$\Delta Breadth_{QTR\ t+1}$		9.635	12.307
		9.1	11.3
Rank $\text{i-risk}_{QTR\ t}$			-0.019
			-1.2
$\Delta Breadth_{QTR\ t-1} \cdot$ Rank $\text{i-risk}_{QTR\ t-1}$			-0.505
			-1.2
$\Delta Breadth_{QTR\ t} \cdot$ Rank $\text{i-risk}_{QTR\ t}$			-2.341
			-1.9
$\Delta Breadth_{QTR\ t+1} \cdot$ Rank $\text{i-risk}_{QTR\ t+1}$			23.481
			8.8
Average quarterly N	4,010	4,010	4,010
R^2	0.2%	5.2%	9.8%

Panel B: Regressions using annual measures

Intercept	0.033	-0.013	-0.016
	3.2	-1.2	-1.3
$\Delta Breadth_{ANN\ t-1}$		-1.654	-1.287
		-4.3	-4.3
$\Delta Breadth_{ANN\ t}$	-0.634	-2.958	-2.668
	-1.2	-5.0	-4.9
$\Delta Breadth_{ANN\ t+1}$		14.887	19.969
		8.6	11.0
Rank $\text{i-risk}_{ANN\ t}$			0.020
			0.4
$\Delta Breadth_{ANN\ t-1} \cdot$ Rank $\text{i-risk}_{ANN\ t-1}$			-3.331
			-2.8
$\Delta Breadth_{ANN\ t} \cdot$ Rank $\text{i-risk}_{ANN\ t}$			-5.350
			-3.4
$\Delta Breadth_{ANN\ t+1} \cdot$ Rank $\text{i-risk}_{ANN\ t+1}$			36.739
			7.7
Average quarterly N	2,977	2,977	2,977
R^2	0.4%	12.6%	19.9%

Table 6

Regression Analysis of Future Size-Adjusted Returns on Prior, Current, and Future Components (IN and OUT) of 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 ($\Delta Breadth_{QTR}$) 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 ($\Delta Breadth_{ANN}$) 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: Quarterly 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
$IN_{QTR\ t+1}$		12.924
		11.5
$OUT_{QTR\ t-1}$		-1.785
		-6.1
$OUT_{QTR\ t}$	-0.741	-0.024
	-2.4	-0.1
$OUT_{QTR\ t+1}$		-7.104
		-6.6
R^2	0.3%	6.2%
Average Quarterly N	4,651	4,651

Panel B: Quarterly 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
$IN_{ANN\ t+1}$		20.966
		9.0
$OUT_{ANN\ t-1}$		-1.965
		-5.6
$OUT_{ANN\ t}$	0.178	0.248
	0.3	0.7
$OUT_{ANN\ t+1}$		-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 ΔBreadth. 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 ($\Delta Breadth_{QTR}$) 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 ($\Delta Breadth_{ANN}$) 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 ΔBreadth	Mean Quarterly Financing by Ranks of $\Delta Breadth_{QTR}$									Mean Annual Financing by Ranks of $\Delta Breadth_{ANN}$						
	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%	**0.51%**	0.66%	0.71%	0.67%	0.60%	10.33%	11.02%	10.42%	**2.41%**	1.69%	2.08%	2.14%
2	2.08%	2.25%	2.02%	1.86%	**1.15%**	1.35%	1.51%	1.41%	1.27%	9.72%	10.12%	8.79%	**3.56%**	3.89%	4.33%	4.40%
3	1.86%	1.56%	1.84%	1.58%	**1.15%**	1.51%	1.44%	1.35%	1.48%	7.75%	7.80%	7.26%	**4.28%**	5.22%	5.03%	4.63%
4	2.37%	2.72%	2.33%	2.25%	**2.02%**	2.16%	2.13%	2.18%	2.02%	9.00%	8.58%	7.89%	**6.20%**	5.59%	5.70%	4.62%
5	2.18%	2.10%	2.25%	2.16%	**1.96%**	2.26%	2.26%	1.99%	2.14%	7.78%	8.23%	7.72%	**7.23%**	7.28%	6.41%	5.84%
6	2.22%	2.12%	2.26%	2.32%	**1.89%**	2.07%	2.03%	2.32%	2.23%	7.73%	7.37%	7.20%	**6.30%**	6.40%	5.89%	4.43%
7	2.07%	1.98%	1.97%	1.89%	**1.80%**	1.87%	2.02%	1.90%	1.66%	8.22%	7.38%	8.03%	**6.82%**	6.91%	5.92%	4.98%
8	1.95%	1.91%	1.99%	1.96%	**1.87%**	2.00%	1.81%	1.75%	1.75%	8.05%	7.52%	7.81%	**7.60%**	6.51%	5.34%	4.31%
9	1.98%	2.00%	1.94%	2.11%	**2.02%**	1.83%	1.75%	1.55%	1.52%	7.42%	7.43%	7.87%	**8.53%**	6.14%	4.35%	3.39%
Highest	1.51%	1.76%	1.96%	2.00%	**3.46%**	2.12%	1.58%	1.39%	1.19%	7.53%	6.68%	7.13%	**10.99%**	5.41%	2.87%	1.67%
Highest-Lowest	-0.56%	-0.30%	0.17%	0.34%	**2.95%**	1.46%	0.88%	0.72%	0.59%	-2.80%	-4.33%	-3.29%	**8.58%**	3.72%	0.79%	-0.48%
t-statistic	-6.2	-3.4	1.9	3.9	**34.4**	19.6	12.5	10.5	8.7	-9.9	-16.5	-13.5	**42.9**	21.7	4.6	-2.6

Panel B: Investment by ranks of change in investor recognition

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