What is common among return anomalies?
Evidence from insider trading decisions[*]

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Abstract

Conventional wisdom suggests that insiders buy shares on positive, and sell on negative, information. Under regulations of insider trading, however, insiders keep silent while possessing extreme information. We find that this phenomenon of insider silence is systematically related to a broad set of anomalies, particularly in the short legs. Specifically, among firms in the short legs, those whose insiders kept silent in the past experience significant negative future returns, which are even lower than when insiders net sold. On average, insider silence accounts for 64% of the short-leg abnormal returns. Our paper provides quantitative evidence of mispricing for return anomalies.

Keywords: Anomaly; Regulation; Insider trading; Insider silence
JEL classifications: G12, G14, G18

"… evidence that variables that predict future cash flows also predict returns does not, by itself, help us determine how much variation in expected returns is caused by risk and how much is caused by mispricing."
        Eugene Fama and Kenneth French (2008, p. 1676): Dissecting anomalies

1. Introduction

A number of firm characteristics predict stock returns in the cross section. Since rational asset pricing models have difficulty explaining these return patterns, they are often viewed as evidence of mispricing (see, e.g., Daniel, Hirshleifer, and Subrahmanyam, 1998; Subrahmanyam, 2007; Antoniou, Doukas, and Subrahmanyam, 2011). On the other hand, as Fama and French (2006, 2008) and Chen, Novy-Marx, and Zhang (2011) point out, the standard valuation equation indicates that, controlling for book-to-market ratios and expected investment, variables that proxy for expected future cash flows are systematically related to expected returns. Because many anomaly variables are proxies for expected cash flows, as Fama and French (2008) argue, evidence that variables that predict future cash flows also predict returns does not help determine how much variation in expected returns is due to rational risk and how much is mispricing.

In this paper we shed light on the two views by examining insider trading decisions among firms that exhibit anomalous returns. If the anomalous returns are due to mispricing and provide ex-ante profit opportunities, insiders should have taken advantage of such opportunities, to the legally permissible extent. Thus, the mispricing view implies that the distribution of the anomalous returns is systematically related to insider trading decisions. The rational risk view does not imply such a pattern.

How would insiders profit from the anomalous returns? Conventional wisdom suggests that insiders buy undervalued and sell overvalued stocks. Thus, a test of mispricing entails comparing stock returns following insiders' buying and selling decisions. This scope of comparison, however, can be inadequate in the context of return anomalies, because anomalous

returns occur mostly when the anomaly variables take extreme values (Fama and French, 2008), a situation in which insiders, due to regulations, might choose not to trade at all. That is, no insider trading, or insider silence, is one type of insider trading decisions in the presence of regulations. The most relevant element of regulations on insider trading that can lead to insider silence is the "disclose or abstain" rule, which requires insiders to disclose the private information before trading on it or to abstain from trading. When disclosing information regarding a company's business for a private benefit to an insider is not feasible—and often this is the case—then this rule essentially dictates that insiders do not trade while possessing private information. Accounting for the cost of enforcement, DeMarzo, Fishman, and Hagerty (1998) prescribe that the optimal enforcement follows large trading volume or large price movements or both and that under such enforcement policy insiders choose not to trade on extreme information and trade aggressively on intermediate information. Thus, regulated insider trading decisions include not only insider buying and selling, but also insider silence.

We examine the implication of regulated insider trading for firms that exhibit anomalous returns, especially firms in the short legs of the anomalies. For firms in the short legs of the anomalies, we hypothesize that firms whose insiders kept silent in the past underperform firms whose insiders net sold, which in turn underperform firms whose insiders net bought.[1]

Our empirical analysis focuses on the five anomalies that Fama and French (2008) examine: net stock issues, momentum, accruals, asset growth, and profitability. Our sample covers a relatively shorter time period (January 1990 to December 2010), during which the insider trading data is available. We first confirm that the anomalies exist during this time period, but are driven by the short legs, in which firms experience negative abnormal returns.

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[1] Section 2 contains detailed development of the hypothesis. Although our main empirical analysis focuses on the short legs, where the anomalous returns are, we also develop and test the hypothesis for firms in the long legs.

Among firms in the short legs, we form portfolios based on their insider trading decisions over the past six months. Firms whose insiders net buy, net sell, and keep silent form the "buy," "sell," and "silence" portfolios, respectively. For these portfolios we examine their future returns. We establish several results that are new to the literature. Over a holding period of up to 12 months, the "silence" portfolio experiences significant negative abnormal returns, which are even lower than the "sell" portfolio, and this pattern holds for microcap firms as well as for large firms. The pattern is common across all anomalies examined. These results are consistent with the notion that insiders abstain from trading while possessing extremely negative information. Further, the impact of insider silence on the short leg returns is economically significant. Across the five anomalies, we estimate that insider silence accounts for an average of 64% of the abnormal returns in the short legs. There is also evidence that the "sell" portfolio underperforms the "buy" portfolio, a pattern that is particularly strong among microcap firms. The main results survive a battery of robustness checks, including alternative methodology of measuring abnormal returns (buy-and-hold vs. monthly alphas), alternative periods during which insider trading activity is measured (three, six, and 12 months), and alternative definitions of the anomaly variables. In addition, the underperformance of the "silence" portfolio exists among firms with high or low litigation risk, firms with high or low institutional ownership, firms covered by few or many analysts, and firms with high and low return volatility.

The balance of the paper is organized as follows. Section 2 develops the hypothesis and discusses the related literature. In Section 3 we describe the sample and data. Section 4 presents the main results, followed by robustness checks in Section 5. We discuss the results on the long legs of the anomalies in Section 6 and conclude in Section 7.

2. Literature and hypothesis

2.1. Return anomalies

Prior research has found that numerous predetermined firm characteristics predict stock returns in the cross-section. For example, Banz (1981) finds that stock returns for small firms are abnormally high. Stocks with high book-to-market ratios have high average returns (Rosenberg, Reid, and Lanstein, 1985; Chan, Hamao, and Lakonishok, 1991; Fama and French, 1992; Lakonishok, Shleifer and Vishny, 1994). More profitable firms experience higher average future returns (Haugen and Baker, 1996; Cohen, Gompers, and Vuolteenaho, 2002). Firms that invest more, however, on average have lower returns (Fairfield, Whisenant, and Yohn, 2003; Titman, Wei, and Xie, 2004). Jegadeesh and Titman (1993) document that past winner stocks experience higher returns over the intermediate term and past loser stocks experience lower returns. Sloan (1996) finds that stock returns are negatively correlated with accruals. Consistent with the combined evidence that stock repurchases predict higher future returns (Ikenberry, Lakonishok, and Vermaelen, 1995) and that stock issuance predicts lower future returns (Loughran and Ritter, 1995), Daniel and Titman (2006) and Pontiff and Woodgate (2008) show that net stock issues and future returns are negatively correlated. Because these return patterns are not explained by either the Capital Asset Pricing Model (CAPM) or the three-factor model of Fama and French (1993), they are often interpreted as evidence of mispricing.

As Fama and French (2006, 2008) and Chen, Novy-Marx, and Zhang (2011) point out, however, the standard valuation model indicates that, after controlling for book-to-market ratio and expected investment, variables that predict future cash flows are systematically correlated with expected returns. Thus, evidence that these variables predict future returns does not by itself distinguish whether the return patterns are due to mispricing or risk.

Examining five anomalies (net stock issues, momentum, accruals, asset growth, and profitability) altogether, Fama and French (2008) find that anomalous returns mostly occur when the anomaly variables take extreme values. In our analysis, we therefore focus on firms in the extremes of the anomaly variable distributions.

2.2. Insider trading and mispricing

Whether the return anomalies are due to mispricing or rational risk is of central interest to finance scholars. Fama and French (2006, 2008) argue that, according to the standard valuation equation, variables that are proxies for future cash flows are systematically related to expected returns. Thus, evidence of such a relation does not help distinguish the risk and mispricing views. Chen, Novy-Marx, and Zhang (2011) develop an alternative three-factor model to explain the anomalies. Choi and Sias (2012) explain why financial strength predicts future returns using subsequent institutional demand and find evidence that the return predictability is due to the gradual incorporation of information instead of rational risk. Stambaugh, Yu, and Yuan (2012) examine the relation between investor sentiment and anomaly returns and find that high level of investor sentiment is systematically related to a broad set of return anomalies. Antonio, Doukas, and Subrahmanyam (2011) study investor sentiment and momentum profits.

We bring in insider trading to help distinguish between the risk and mispricing views, following the literature that relates insider trading to mispricing. Seyhun (1990), for example, studies insider trading patterns during and after the Crash of October 1987 to test if the Crash is due to noise trader overreaction instead of fundamental shifts. He finds that corporate insiders became buyers of stock in record numbers immediately following the Crash; that stocks that declined more during the Crash were also purchased more by insiders; and that stocks that were purchased more extensively by insiders during October 1987 showed larger positive returns in

1988. Based on these findings, Seyhun (1990) concludes that overreaction was an important part of the Crash.

Rozeff and Zaman (1998) examine insider trading among growth and value stock categories and provide new insight into value premium. They argue that if value and growth categories provide profit opportunities insiders should have incentives to take advantage of the mispricing, to the legally permissible extent, by buying value and selling growth stocks. On the other hand, if growth and value categories are not meaningful measures of deviations of stock prices from fundamental values, then insider trades are not expected to be related to these categories. They find strong evidence that insider demand is systematically related to the value/growth categories. Insiders tend to buy value stocks and sell growth stocks. By controlling for insiders' superior knowledge about future performance, Piotroski and Roulstone (2005) find evidence that insiders trade against mispricing. Jenter (2005) tests the hypothesis that managers perceive their own stock as misvalued when making corporate decisions by using managers' own portfolio trades as a window into their beliefs. He argues that because insiders trade with their own money insider trading is a strong and direct indicator of whether managers view their company stocks as mispriced. Sias and Whidbee (2010) examine whether insiders trade against institutions or individuals and find that net insider demand is negatively correlated with institutional demand of the same quarter as well as that of the past four quarters. After accounting for the impact of liquidity and stock characteristics, they attribute the remaining correlation between net insider demand and institutional demand to perceived mispricing. That is, insiders are more likely to perceive stocks as overvalued if institutions buy heavily in the past.

2.3. Insider silence

The foregoing discussions suggest that one may test mispricing by examining insiders' buying and selling decisions among firms that exhibit anomalous returns. Such a scope of comparison, however, is insufficient because the firms that exhibit anomalous returns are in the tails of the distributions of the anomaly variables. That is, these are the firms that have recently issued or repurchased extremely large amount of stocks, firms that are extremely unprofitable or extremely profitable, firms that have experienced extremely large price upswing or downturn, firms that have extremely high or low accruals, or firms that have grown extremely fast or have experienced large contractions. To the extent that such extreme business conditions are associated with extreme future stock price movements and that corporate insiders have superior knowledge about firm performance (Piotroski and Roulstone, 2005), insiders might choose not to trade. This is because insider trading is regulated and in general trading on material, nonpublic information is illegal. To avoid regulatory action, insiders choose not to trade when they possess extreme information. The most relevant element of federal regulation on insider trading is the so-called "disclose or abstain" rule, which requires that insiders disclose the private information before trading on it. Since in most cases disclosure is not an option, this rule essentially requires that insiders do not trade while possessing private information. Taking into account the cost of enforcement, DeMarzo, Fishman, and Hagerty (1998) point out that the optimal enforcement follows large trading volume or large price movements or both and that insiders trade aggressively on intermediate information but do not trade when the information is extreme. Recently Gao and Ma (2012) report that insider silence is associated with extreme future returns, suggesting that insider silence is an important component of insider trading decisions.

To account for the impact of regulation on insider trading behavior, we consider the full spectrum of insider trading decisions: insider buying, insider selling, and insider silence. We discuss our hypothesis more formally in the next subsection.

2.4. The regulated insider trading (RIT) hypothesis

We propose and test a regulated insider trading (RIT) hypothesis to shed light on the role of mispricing for firms that exhibit anomalous returns. For ease of exposition, we develop the hypothesis separately for firms in the short and long legs of the anomalies.

Note that firms in the short legs of the anomalies are associated with negative average future returns. If these returns represent deviations of stock prices from fundamental values they provide ex-ante profitable opportunities. Since insiders have superior knowledge, insiders should have exploited such opportunities, to the legally permissible extent. Thus, insiders buy or sell if they believe their firm future performance is not so extreme to trigger regulatory or legal action against them. On the other hand, if insiders believe their firm is to experience extremely negative performance, due to the fear of regulatory action, they choose not to sell. Neither would they buy, given the unfavorable prospects. Thus extremely negative future performance is associated with insider silence. In sum, we have the RIT hypothesis: Among firms in the short legs of the anomalies, insider silence predicts significant negative returns, which are even lower than returns of firms whose insiders net buy or sell. In addition, as conventional wisdom suggests, firms whose insiders net buy earn higher (less negative) future returns than firms whose insiders net sell. In sum, $R(silence) < R(sell) < R(buy)$.

For the long legs of the anomalies we maintain the hypothesis that portfolios with insider buying outperform portfolios with insider selling. That is, $R(buy) > R(sell)$. When it comes to insider silence, there are at least two reasons for potential differences between short and long

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legs. The first reason for the differences, in our setting, is related to insider trading decisions and the probability of legal action. Firms in the anomaly long legs tend to have positive returns. Because firms with positive returns are less likely to attract regulatory action (Gande and Lewis, 2009), insiders are more likely to trade on the positive news (Cheng and Lo, 2006). Therefore, it is not expected that insider silence is associated with higher future returns, weakening the connection between insider silence and future positive returns.

The second reason is that a positive signal is easier to arbitrage away and hence abnormal returns in the long legs of anomalies are more likely to decay. Arbitrageurs' buying activity corrects the average undervaluation of firms in the long legs. For firms that reside in the left tail of the distribution of future performance, however, the buying activity pushes the prices above and further away from their intrinsic value, leading to overvaluation. Insiders of such firms, aware of the impact of arbitrageurs' activity on firm valuation and the resulting reversal in the future, choose not to sell, as insider selling before stock price reversal would trigger regulatory or legal action. Neither do they buy, given the negative outlook. In these cases insiders will remain silent, strengthening the connection between insider silence and future negative returns in the long legs of anomalies.

In sum, among firms in the long legs of the anomalies, insider silence is associated with lower returns than returns of firms whose insiders net buy or sell.

3. Data and sample

We obtain insider trading data from Thomson Reuters Insider Filing Data Feed. The Securities and Exchange Commission (SEC) mandates that officers and directors, large shareholders (those who own 10% or more of the outstanding shares), and affiliated shareholders report their transactions to the SEC by the 10th of the month following the transactions (prior to

August 2002) or within two days (since August 2002). Following previous studies (e.g., Rozeff and Zaman, 1998; Piotroski and Roulstone, 2005; Sias and Whidbee, 2010), we limit our analysis to officers and directors because previous research shows the information content of insider trading is mainly limited to trades by directors and officers.[2] Defined in equation (1), the net insider demand (NID) for month j is the total number of shares insiders buy minus the total number of shares insiders sell over the past six months, normalized by the total number of shares outstanding at the end of month j-1. Our main analyses are based on NID measured over the past six months, although our results are robust to NID measured over the past three or 12 months.

$$NID_j = \frac{\#\ shares\ insiders\ buy_{j-6,j-1} - \#\ shares\ insiders\ sell_{j-6,j-1}}{\#\ shares\ outstanding_{j-1}} \tag{1}$$

We use NID to form portfolios. Firms with positive, non-positive, and missing NID form the "buy," "sell," and "silence" portfolios, respectively. The portfolio returns start from month j.

We obtain stock return data from CRSP and accounting data from Compustat. In our analysis we focus on the five anomalies examined in Fama and French (2008), whom we follow to construct the anomaly variables. The five anomalies are net stock issues, momentum, accruals, growth of assets, and profitability. We follow the recent literature to construct the buy-and-hold abnormal returns after portfolio formation (Lakonishok and Lee, 2001; Sias and Whidbee, 2010). All variables are defined in greater detail in the Appendix.

The sample is based on all NYSE/Amex/NASDAQ common stocks (share code 10 or 11) covered in CRSP/Compustat merged database from January 1990 to December 2010, a total of 252 year/month cross-sections. The starting point of the sample period is determined by when

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[2] We follow the literature (e.g., Lakonishok and Lee 2001; Sias and Whidbee 2010) to "clean" the insider trading data. Specifically, we use the following filters. We delete duplicate and amended records and records with cleanse code of "S" or "A" are deleted. Transaction price must be available, and we delete records if the number of shares in a transaction is below 100. The transaction code is either "P" or "S" for stock transactions and "M" for options exercised. We delete transactions that involve more than 20% of total shares outstanding, and delete records if the transaction price is outside the 80%−120% range of the CRSP end-of-day stock price.

insider trading data is available. We apply standard filters: we exclude stocks whose prior month-end price is lower than $2 and firms that are younger than a year (from the first month on CRSP file with valid price and return data); we exclude financial firms (Standard Industry Codes between 6000 and 6999) and firms with missing or non-positive book value of equity. Because we examine the five anomalies separately, we do not require that all anomaly variables are non-missing. Thus the average number of firms for a month varies across the anomalies and is 3,388, 3,388, 3,054, 3,149, and 3,386 for the anomalies of net stock issues, momentum, accruals, growth of assets, and profitability, respectively.

4. Main results

Our portfolio construction closely follows Fama and French (2008). Specifically, every month we first sort firms into microcap and all but microcap (ABM, thereafter) groups, using the 20th NYSE size percentile as the cutoff point.[3] Within each size group we further form portfolios based on one of the five anomaly variables. To be able to make meaningful comparisons between microcap and ABM firms, the sorts on an anomaly variable use the same breakpoints for both size groups, and the breakpoints come from the ABM firms only. For momentum we form simple quintiles. For net stock issues, we form quintiles for the positives (net issues), two equal groups for the negatives (net repurchases), and a group for the zeros, resulting in a total of eight groups. For the other three anomaly variables (accruals, growth of assets, and profitability) we form seven groups: two for the negatives and five for the positives.

4.1. The anomalous returns

We first confirm that in the shorter time period our dataset covers we still observe anomalous returns in the tails of the anomaly variables. Specifically, in Table 1 we show the

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[3] To maintain reasonable portfolio sizes in our analysis we do not further separate small (between the 20th and 50th NYSE size percentiles) and large (above the 50th percentile) firms. Instead we pool them together into the ABM group. Our main results, however, hold qualitatively in the two individual groups.

equal- and value-weight buy-and-hold abnormal returns (BHAR) for the portfolios sorted on each of the anomaly variables over the holding period of one (Panel A) and 12 months (Panel B). For ease of exposition the portfolios are ordered from the short legs to the long legs, followed by the hedge (long minus short) portfolios. For example, the highest quintile of positive net stock issues (firms that issue equity heavily) predicts negative returns so it is presented in the column to the left, and the lower half of the negative net stock issues (firms that repurchase a large amount) predicts positive returns so it is presented in the column to the right. For Panel B, tests for all portfolio returns are based on Newey-West standard errors. To see the impact of firm size on anomaly returns we conduct the analysis for the whole market, microcap firms, and ABM firms, respectively.

Panel A shows that the short leg of the net stock issues produces a one-month equal-weight abnormal return of -0.67%, significant at the 1% level. This pattern holds for both microcap and ABM groups. The value-weight returns, however, are significant for the whole market and microcap firms, but not for the ABM firms. This result is consistent with the literature that firms earn significant negative returns after stock issuance. Except for the portfolios of the zeros, there is no systematic evidence of abnormal returns among the other portfolios. The returns are significant for all six hedge portfolios except for the value-weight ABM group. The overall pattern is consistent with Fama and French (2008) in that much of the action in anomalous returns occurs in the extremes where the anomaly variable—in this case net stock issues—takes extreme values. What is noteworthy, there are no significant positive returns in the long legs, which is consistent with investors exploiting academic research (McLean and Pontiff, 2012). Due to limits to arbitrage, however, the short legs, especially among microcap firms remain significant. This pattern of anomalous returns appears to hold in the other four

anomalies as well. On an equal-weight basis, the short legs experience significant negative returns, especially among microcap stocks. The pattern in value-weight returns is qualitatively similar. Except for momentum, there is no evidence of significant positive abnormal returns in the long legs. As is expected, it is much easier for outside investors to buy stocks on positive signals than to sell stocks short on negative signals.

In Panel B we present the portfolio BHARs for a 12-month holding period. The general patterns across the portfolios are consistent with those in Panel A. Namely, there are significant negative returns in the short legs, there is not much evidence of abnormal returns in most of the other portfolios, and the hedge returns are positive, and significantly so for over half of the portfolios. In addition, the patterns are stronger in the microcap groups than in the ABM groups. The overall findings are consistent with Fama and French (2008) in that most of the action in anomalous returns occurs in the extremes and with McLean and Pontiff (2012) in that investors exploit return anomalies discovered by academic research subject to costly arbitrage.

[Insert Table 1 about here]

The anomalous returns in the short legs suggest we focus on these firms.

4.2. Regulated insider trading in the short legs

Among firms in the short legs, we further form portfolios based on their insider trading activity over the past six months. Firms whose insiders net buy (positive NID), net sell (non-positive NID), and keep silent (no insider trading activity) form the "buy," "sell," and "silence" portfolios, respectively. We then examine the portfolios' BHARs over the subsequent one to 12 months. The RIT hypothesis implies that R(silence) < R(sell) < R(buy).

Table 2 presents the portfolio BHARs for the holding periods of one, six, and 12 months, as well as the spreads between the "buy" and "sell" portfolios, and between the "silence" and

"sell" portfolios. All tests are based on Newey-West standard errors. We conduct the analysis for the whole, microcap, and ABM groups, respectively. Figure 1 shows the BHARs of the three insider trading portfolios for holding periods of one to 12 months for the market (Panel A), microcap (Panel B), and ABM (Panel C) groups, respectively.

The results in Table 2 strongly support the RIT hypothesis. In the case of net stock issues, for example, the "silence" portfolio experiences an average abnormal return of -10.20% over a holding period of 12 months, while the returns of the "sell" and "buy" portfolios are -5.93% and -1.98%, respectively. Further, tests on the spreads clearly suggest that the "silence" portfolio underperforms the "sell" portfolio, which in turn underperforms the "buy" portfolio. This pattern holds for the holding periods of one and six months as well.

Further, the return pattern across the three insider trading portfolios holds for both microcap and ABM groups. There are, however, noticeable differences. For microcap firms, the spread between the "buy" and "sell" portfolios appears more significant than that between the "sell" and "silence" portfolios. Among ABM firms, the spread between the "silence" and "sell" portfolios is more significant than that between the "buy" and "sell" portfolios. This asymmetric pattern in portfolio return spreads between the two size groups can be seen more clearly in Panels B and C of Figure 1. The evidence suggests that the impact of regulation on insider trading behavior is pervasive, and is particularly strong among relatively larger firms.

Figure 2 shows, for each of the remaining four anomalies, the BHAR returns of the "buy," "sell," and "silence" portfolios over the holding periods of one to 12 months. For brevity we only show the results with the two size groups combined. It is clear that the "silence" portfolios underperform both the corresponding "buy" and "sell" portfolios. The differences between the "buy" and "sell" portfolios, however, are significant only for accruals and

profitability, but not for momentum and asset growth, as shown in the corresponding panels in Table 2. Notably, in both size groups of all four anomalies the "silence" portfolios underperform the corresponding "sell" portfolios, and significantly so in most cases. By contrast, the "buy" outperforms "sell" mostly for microcap firms only. For the asset growth anomaly, the spread between the "buy" and "sell" portfolios among ABM firms becomes negative over the longer holding period, although the difference is not statistically significant.

It is worth noting that insider silence is associated with even lower returns in microcap firms than in ABM firms. To the extent that insider silence is associated with less efficient prices, the evidence is consistent with the presumption that investors are better informed and that arbitrage cost is lower for larger firms. We later explore this issue in more depth within a broader context of limits to arbitrage or information uncertainty of the firms (see Section 5.4).

To assess the economic significance of insider silence, we use equation (2) to estimate, for a 12-month holding period for all firms in the short legs of the anomalies, the proportion of the returns that is attributable to insider silence.

$$Proportion\ by\ insider\ silence = 1 - \frac{BHAR\ excluding\ the\ "silence"\ portfolio}{BHAR\ of\ all\ firms} \qquad (2)$$

For the anomaly of net stock issues, for example, the average BHAR for all firms in the short leg is -6.71% over a 12-month holding period (see Panel B of Table 1). Unreported for brevity, the estimated average BHAR excluding the "silence" portfolio is -4.54%, which is a combination of the "buy" and "sell" portfolios. Equation (2) implies that insider silence accounts for 32.3% (1-4.54/6.71) of the overall returns in the short leg. Similarly, we estimate that this proportion is 96.6%, 57.1%, 38.3%, and 96.4% for the anomalies of momentum, accruals,

growth of assets, and profitability, respectively. That is, insider silence accounts for an average of 64% of the short leg returns, across the five anomalies.[4]

In sum, Table 2 and Figures 1 and 2 establish a common pattern among the five anomalies, particularly regarding the firms in the short legs. First, there is a clear pecking order in returns among the three insider trading portfolios. Firms whose insiders keep silent underperform firms whose insiders sell, which in turn underperform firms whose insiders buy. This result supports the RIT hypothesis in that corporate insiders take advantage of the private information contained in the anomaly variables, to the legally permissible extent. Second, this pecking order is pervasive in that it exists in both microcap and relatively larger firms. Third, insider silence accounts for an economically significant portion of the anomalous returns.

The evidence that these anomalous returns in the short legs of the anomalies are systematically related to insider trading decisions indicates that the anomalous returns are driven, at least partly, by investors underreacting to information contained in past insider trading decisions, particularly insider silence. In this regard, the evidence of a common pattern related to regulated insider trading lends further credence to the mispricing view of return anomalies.

[Insert Table 2 about here]

[Insert Figures 1 & 2 about here]

5. Robustness checks

5.1. Alternative methodology: monthly alphas

In our main analysis we use BHAR to measure abnormal returns. Estimating long-term abnormal returns has long been cautioned (e.g., Fama, 1998). Therefore, we check whether our results hold for alternative method of measuring abnormal returns. To do so we estimate monthly

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[4] Similar analysis shows that these proportions are 53.1% and 48.9% for the holding period of one and six months, respectively.

alphas from the three-factor asset pricing model developed by Fama and French (1993). For ease of exposition we present three-month average monthly alphas for the four three-month periods following portfolio formation. Specifically, following the formation of each portfolio, we form calendar time equal- and value-weight portfolios of the stock returns over a three-month period and regress the excess returns on the Fama and French (1993) three factors. The alphas are the average abnormal monthly returns for the three-month period.

Table 3 presents the results for the three insider trading portfolios of firms in the short legs. To match the structure in Table 2 we also estimate the alphas for the microcap and ABM groups individually. The overall message in Table 3 is consistent with that in Table 2. We use net stock issue to illustrate the main point. With both microcap and ABM groups combined, the "silence" portfolio has significant equal-weight alphas of -1.06%, -1.00%, -0.97%, and -0.75% over the four three-month periods following portfolio formation, respectively. The "sell" portfolio also has significant alphas over the four three-month periods. By contrasts, the alphas associated with the "buy" portfolio are largely not significant. These findings are in general consistent with the BHAR patterns in Table 2. The spreads between the "buy" and "sell" portfolios and between the "sell" and "silence" portfolios are also consistent with the patterns in Table 2. The spread between the "buy" and "sell" portfolios becomes significant over the latter two three-month periods while that between the "silence" and "sell' portfolios are significant in the earlier three three-month periods. The value-weight alphas exhibit a similar pattern.

The general pattern holds in the microcap and ABM groups as well: both "silence" and "sell" portfolios experience significant negative returns over the 12 months following portfolio formation, while the alphas associated with the "buy" portfolios are mostly not significant. The spreads between the insider trading portfolios, however, differ between the two size groups. In

microcap firms, the spreads between the "buy" and "sell" portfolios are significant while those between the "silence" and "sell" portfolios are not. By contrasts, the ABM firms have significant spreads between the "silence" and "sell" but not between the "buy" and "sell" portfolios. These patterns are again consistent with those in Table 2. Value-weight alphas for the individual size groups show similar patterns.

These patterns in the anomaly of net stock issues hold qualitatively in the remaining four anomalies as well, with minor caveats. For momentum, there is some evidence of reversal over the latter two three-month periods. For growth of assets, the spreads between the "buy" and "sell" portfolios are actually negative and significant, particularly for the value-weight case in the ABM group. It appears that insiders in firms with extremely high asset growth are overconfident in that they net buy own company stocks that subsequently underperform.

[Insert Table 3 about here]

5.2. Alternative definitions of net insider demand

In our main analysis we measure net insider demand over a six-month window prior to portfolio formation. We now examine whether the main results in Table 2 hold for alternative windows to measure insider trading activity. To do so, we repeat the analysis in Table 2 by redefining the "buy," "sell," and "silence" portfolios based on net insider demand measured over three- and 12-month periods, respectively.

The results are presented in Table 4, which has the identical structure of Table 2. Panel A (B) is based on a window of 12- (three-) month period to measure past insider trading activity. When insider trading activity is measured over a longer (shorter) time period, fewer (more) firms join the "silence" portfolios. For example, in the case of net stock issues, the average numbers of stocks in the "silence" portfolios in Table 2 for the microcap and ABM groups are 123 and 50,

respectively, and these numbers decrease to 79 and 27 in Panel A (a longer window) of Table 4 and increase to 169 and 84 in Panel B (a shorter window) of Table 4, respectively.

Despite change in composition of the portfolios due to alternative windows to measure past insider trading activity, the overall patterns shown in both Panels of Table 4 are remarkably similar to those shown in Table 2. Notably, the "silence" portfolios underperform the "sell" portfolios, especially among the relatively larger firms and the "buy" portfolios outperform the "sell" portfolios, especially among the microcap firms.

[Insert Table 4 about here]

5.3. Alternative definitions of anomaly variables

In our main analysis we follow Fama and French (2008) to define the anomaly variables. For some of the anomaly variables, there are alternative definitions used in the literature. Largely following Stambaugh, Yu, and Yuan (2012), we use NS12 and NS6 as alternative definitions for net stock issues, Mom6 for momentum, and Inv and AG for asset growth. These variables are defined in the Appendix.

For these five alternatively defined anomaly variables, we conduct the same analysis as in Table 2 and present the results in Table 5. Once again, our main results hold. For brevity, we do not go into the details but simply reiterate the main patterns that the "silence" portfolios underperform the "sell" portfolios, especially among larger firms and that the "buy" portfolios outperform the "sell" portfolios, especially among microcap firms.

[Insert Table 5 about here]

5.4. Information environment and limits to arbitrage

Our findings so far suggest that regulated insider trading, in particular insider silence, at least partially accounts for the negative returns in the short legs of the anomalies. That is, due to

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fear of regulatory and legal action, insiders choose not to sell (nor to buy) own firm shares while possessing extremely bad information, which is reflected in significant negative future returns. The lack of insider trading decreases the flow of insider information into the market, leading to less efficient prices. The evidence suggests that either investors are not fully rational about the insider silence information, or arbitrage is costly, or both. It is possible, for example, that there are not enough investors that are informed about insider silence, or that high stock volatility acts as an impediment to arbitrage and prevents informed investors from fully taking advantage of the price inefficiency.

To explore the role of information environment in insider silence, we use institutional ownership and number of analysts following as proxies.[5] Due to competition, higher institutional ownership increases price discovery and information efficiency (Chiang, Qian, and Sherman, 2010); institutional investors take advantage of mispricing in equity markets (Cohen, Gompers, and Vuolteenaho, 2002; Campbell, Ramadorai, and Schwartz, 2009). Thus a higher level of institutional ownership implies more intensive information acquisition, more informed trading and consequently more efficient prices (Sias, Starks, and Titman, 2006; Boehmer and Kelly, 2009). Analysts collect, analyze and distribute information about a firm. Thus a firm with more analysts following is associated with better information environment and more efficient prices (e.g., Brennan and Subrahmanyam, 1995; Lang and Lundholm, 1996; Hong, Lim, and Stein, 2000; Asquith, Mikhail, and Au, 2005).

To explore the role of limits to arbitrage, we use stock volatility as a proxy. According to Shleifer and Vishny (1997), real-life arbitrageurs have relatively short investment horizons. Thus

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[5] Similar proxies are discussed in Ali, Hwang, and Trombley (2003), Baker and Wurgler (2006), Brav, Heaton, and Li (2010), and Lam and Wei (2011). See also Choi and Sias (2012). Our conclusion in this section holds for other proxies such as firm age, number of institutional owners, stock liquidity, etc. Unreported for brevity, the results are available upon request.

arbitrageurs might be forced to liquidate their positions when the prices move against them. Stocks with greater volatility exacerbate such risk. Understanding these risks, arbitrageurs may abstain from more volatile stocks, allowing mispricing to prevail to a larger extent among portfolios of more volatile firms.

Taken together, these discussions suggest that, among firms in the "silence" portfolios, those with higher institutional ownership, more analysts following, and lower stock volatility are associated with lower degree of mispricing (less negative future returns).

Note that all three proxies are correlated with firm size, and, as our earlier results indicate, the returns associated with insider silence are also correlated with firm size. Thus in our empirical analysis we control for size. Specifically, we first sort firms into microcap (below the 20th NYSE size percentile), small (between the 20th and 50th NYSE size percentiles), and large (above the 50th NYSE size percentile) groups. Within each size group we sort firms into terciles on one of the three proxies. The terciles are then pooled across the size groups. We estimate the BHARs for each tercile. Table 6 presents the results for the two extreme terciles and the t-statistics testing equal means between the two. From these results we test 1) whether insider silence predicts significant negative future returns even among firms with better information environment or low limits to arbitrage; and 2) whether firms with worse information environment or greater limits to arbitrage are associated with even lower returns (thus more mispricing).

The top panel of Table 6 shows the results for institutional ownership terciles. The negative and significant BHARs presented in the middle three columns suggest that insider silence is associated with significant negative future returns even when the firms have high institutional ownership. When institutional ownership is low, these abnormal returns are even

lower. For example, in the case of net stock issues, over a 12-month holding period, the BHAR associated with high institutional ownership is -6.49% while that with low institutional ownership is -13.95%. The difference between the two has a t-statistics of 2.98, as presented in the last column of the first row. This pattern of more negative BHARs associated with low institutional ownership holds in general for all the holding periods and for all the five anomalies. Shown in the last three columns of the top panel in Table 6, 10 out of 15 t-statistics are above 2 and the minimum is 1.37. The patterns for analyst following are similar. Insider silence is associated with significant negative future returns even for firms with many analysts following and firms with fewer analysts exhibit more negative BHARs.

For volatility, we find that for stocks with high or low volatility BHARs are negative and highly statistically significant for all anomalies at all horizons. In all 30 cases but one, the significance is at 1% level. The results also indicate that abnormal returns for high volatility stocks are more negative than abnormal returns for low volatility stocks.

Taken together, the overall results in Table 6 are consistent with our conjecture that worse information environment and greater limits to arbitrage are associated with more negative returns. Improved information environment and weaker limits to arbitrage, however, do not explain the negative returns associated with insider silence.

[Insert Table 6 about here]

5.5. The role of litigation risk

Firms vary in terms of litigation risk (Kim and Skinner, 2012). A question then arises whether insider silence acts as a proxy for litigation risk. To explore this possibility, we compute a measure of litigation risk for the firms in our sample (the measure, KS, is defined in the Appendix). We then separate firms in the short legs whose insiders do not trade over the past six

months into two groups with low and high litigation risk, respectively, and examine their future returns. Table 7 presents the BHARs of the two litigation risk groups. The results show that that negative returns following insider silence hold in both high litigation risk and low litigation risk subsamples. All are significant at least at the 5% level, and in the vast majority the significance is at the 1% level. Therefore, the main results are not likely to be driven by litigation risk.

[Insert Table 7 about here]

5.6. Summary

The main results survive a battery of robustness checks. The results hold when performance is measure by alphas rather than buy-and-hold abnormal returns. The results remain unchanged under alternative definitions of the anomaly variables and alternative windows to measure insider trading activity. The results also hold for firms with high and low institutional ownership, with few and many analysts following, and with high and low volatility. The results are not driven by litigation risk.[6]

6. Regulated insider trading and the long legs of the anomalies

We now study the long legs of the anomalies. We maintain the hypothesis that portfolios with insider buying outperform portfolios with insider selling. When it comes to insider silence, there are at least two reasons for potential differences between short and long legs. The first reason for the differences, in our setting, is related to insider trading decisions and the probability of legal action. Firms in the anomaly long legs tend to have positive returns. Because firms with positive returns are less likely to attract regulatory action (Gande and Lewis, 2009), insiders are more likely to trade on the positive news (Cheng and Lo, 2006). Therefore, it is not expected that

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[6] The original sample covers the period January 1990 to December 2010, which includes extremely volatile years at the end of the sample. The test whether our results are affected by extreme volatility at the end of the sample, we repeat our main analysis excluding the years 2007—2010. The results (not reported for brevity) are remarkably similar to Table 2.

insider silence is associated with higher future returns, weakening the connection between insider silence and future positive returns.

The second reason is that a positive signal is easier to arbitrage away and hence abnormal returns in the long legs of anomalies are more likely to decay. Arbitrageurs' buying activity corrects the average undervaluation of firms in the long legs. For firms that reside in the left tail of the distribution of future performance, however, the buying activity pushes the prices above and further away from their intrinsic value, leading to overvaluation. Insiders of such firms, aware of the impact of arbitrageurs' activity on firm valuation and the resulting reversal in the future, choose not to sell, as insider selling before stock price reversal would trigger regulatory or legal action. Neither do they buy, given the negative outlook. In these cases insiders will remain silent, strengthening the connection between insider silence and future negative returns in the long legs of anomalies.

Table 8 shows buy-and-hold abnormal returns for insider trading portfolios for firms in the anomaly long legs. The first panel shows results for the net stock issues anomaly. There is some evidence that the "buy" portfolio experiences positive future returns. The 12-month BHAR for the whole market and microcap firms are 3.19% and 4.14%, both significant at the 5% level. The "silence" portfolios are associated with negative future returns, although none is significant. There are no significant returns associated with the "sell" portfolio, either. As expected, the "silence" portfolios significantly underperform the "buy" portfolios. For the whole market, the spread between the "silence" and "buy" portfolios equals -0.34% ($t = -2.14$), -1.90% ($t = -2.12$) and -4.51% ($t = -2.74$) for the one-, six- and 12-month horizons, respectively. The differences in abnormal returns are larger in magnitude for microcaps and are equal to -0.36% ($t = -1.69$), -2.05% ($t=-1.64$), -5.88% ($t=-2.19$) for the one-, six-, and 12-month horizons, respectively.

Similar patterns hold for the other four anomalies, with some notable differences. For momentum, accruals, and asset growth, the "silence" portfolios are associated with significant negative abnormal returns, especially among microcap firms. Results with profitability are the weakest. Nevertheless, the significant negative spreads between the "silence" and "buy" portfolios hold across all five anomalies, especially among the microcap firms.

Overall, the findings on the long legs are also consistent with the notion that insiders possess superior knowledge about their own firms and that they exploit the information in their own trading, to the legally permissible extent.

[Insert Table 8 about here]

7. Conclusion

In this paper we use insider trading to shed light on the role of mispricing in return anomalies. We document a common feature among a broad set of return anomalies. Conventional wisdom suggests that insiders buy shares on positive information and sell on negative information. Under regulations of insider trading, however, insiders keep silent when they possess extreme information. We find that this pattern of regulated insider trading is closely related to a broad set of return anomalies, particularly in the short legs. Specifically, among firms with extreme characteristics that predict anomalously low returns, firms whose insiders kept silent in the past earn significant negative future returns, which are even lower than when insiders net sold. We estimate that this phenomenon of insider silence explains about 64% of the anomalous returns in the short legs of the anomalies. The results remain after a battery of robustness checks. Our evidence further supports that return anomalies are at least partly due to mispricing.

References

Ali, A., Hwang, L., Trombley, M. A., 2003. Arbitrage risk and the book–to–market anomaly. Journal of Financial Economics 69, 355–73.

Antonio, C., Doukas, J., Subrahmanyam, A., 2011. Sentiment and Momentum. SSRN Working paper, http://ssrn.com/abstract=1479197.

Asquith, Paul, Michael B. Mikhail, and Andrea S. Au. 2005. Information content of equity analyst reports. Journal of Financial Economics 75(2), pp. 245—282.

Baker, M., Wurgler, J., 2006. Investor sentiment and the cross–section of stock returns. Journal of Finance 61, 1645–80.

Banz, Rolf W., 1981, The relationship between return and market value of common stocks, Journal of Financial Economics 9, 3–18.

Boehmer, E., Kelley, E. K., 2009. Institutional investors and the informational efficiency of prices. Review of Financial Studies 22, 3563-3594.

Brav, A., Heaton, J. B., Li, S., 2010. The limits of the limits of arbitrage. Review of Finance 14, 157–87.

Brennan, Michael and A. Subrahmanyam. 1995. Investment analysis and price formation in securities markets. Journal of Financial Economics 38, pp. 361—381.

Campbell, J. Y., Ramadorai, T., Schwartz, A. 2009. Caught on tape: institutional trading, stock returns, and earnings announcements. Journal of Financial Economics 92, 66-91.

Chan, Louis K.C., Yasushi Hamao, and Josef Lakonishok, 1991, Fundamentals and stock returns in Japan, Journal of Finance 46, 1739–1789.

Chen, L., R. Novy-Marx, and L. Zhang. 2011. An Alternative Three-factor Model. Working Paper, Washington University in St. Louis, University of Chicago, and University of Michigan.

Cheng, Q., Lo, K., 2006. Insider trading and voluntary disclosures. Journal of Accounting Research 44, 815-848.

Chiang, Y. M., Qian, Y., Sherman, A. E., 2010. Endogenous entry and partial adjustment in IPO auctions: are institutional investors better informed? Review of Financial Studies 23, 1200-30.

Choi, N.Y., Sias, R.W., 2012. Why does financial strength forecast stock returns? Evidence from subsequent demand by institutional investors. Review of Financial Studies 25, 1550–1587.

Cohen, Randolph B., Paul A. Gompers, and Tuomo Vuolteenaho, 2002, Who underreacts to cash flow news? Evidence from trading between individuals and institutions, Journal of Financial Economics 66, 409–462.

Daniel, K.; D. Hirshleifer; and A. Subrahmanyam. "Investor Psychology and Security Market Under and Overreactions." Journal of Finance, 53 (1998), 1839–1886.

Daniel, Kent, and Sheridan Titman, 2006, Market reactions to tangible and intangible information, Journal of Finance 61, 1605–1643.

DeMarzo, P., Fishman, M., Hagerty, K., 1998. The optimal enforcement of insider trading regulations. Journal of Political Economy 106, 602–632.

Fairfield, Patricia M., Scott Whisenant, and Terry Lombardi Yohn, 2003, Accrued earnings and growth: Implications for future profitability and market mispricing, The Accounting Review 78, 353–371.

Fama, E. F., 1998, Market efficiency, long-term returns and behavioral finance, Journal of Financial Economics 49, 283–306.

Fama, E. F., and K. R. French. 1992, The cross-section of expected stock returns, Journal of Finance 47, 427–465.

Fama, E. F., and K. R. French. 1993. Common risk factors in the returns on stocks and bonds. Journal of Financial Economics 33, 3–56.

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

Fama, E. F., and K. R. French. 2008. Dissecting Anomalies. Journal of Finance 63:1653–78.

Gande, Amar, and Craig M. Lewis, 2009, Shareholder-initiated class action lawsuits: Shareholder wealth effects and industry spillovers. Journal of Financial and Quantitative Analysis 44, 823-850.

Gao, George and Ma, Qingzhong, The sound of silence: What do we know when insiders do not trade? (October 28, 2012). Available at SSRN: http://ssrn.com/abstract=2167998.

Haugen, Robert A., and Nardin L. Baker, 1996, Commonality in the determinants of expected stock returns, Journal of Financial Economics 41, 401–439.

Hong, Harrison, Terry Lim, and James C. Stein, 2000, Bad news travels slowly: Size, analyst coverage, and the profitability of momentum strategies, Journal of Finance 55, 265–295.

Ikenberry, David, Josef Lakonishok, and Theo Vermaelen, 1995, Market underreaction to open market share repurchases, Journal of Financial Economics 39, 181–208.

Jegadeesh, N., Titman, S., 1993. Returns to buying winners and selling losers: implications for stock market efficiency. Journal of Finance 48, 65–91.

Jenter, D., 2005. Market timing and managerial portfolio decisions. Journal of Finance 60, 1903–49.

Jones, C. L., and S. E. Weingram. "The Effects of Insider Trading, Seasoned Equity Offerings, Corporate Announcements, Accounting Restatements, and SEC Enforcement Actions on 10b-5 Litigation Risk." Working Paper, Stanford University (1996).

Kim I., Skinner, D.J., 2012. Measuring securities litigation risk. Journal of Accounting and Economics 53, 290-310.

Lakonishok, J., Lee, I., 2001. Are insider trades informative? Review of Financial Studies 14, 79–111.

Lakonishok, J., Shleifer, A., Vishny, R.W., 1994. Contrarian investment, extrapolation, and risk. Journal of Finance 49, 1541–1578.

Lam, F.Y.E.C., Wei, K.C.J., 2011. Limits–to–arbitrage, investment frictions, and the asset growth anomaly. Journal of Financial Economics 102, 127–49.

Lang, Mark and Russell J. Lundholm, 1996, Corporate disclosure policy and analyst behavior. The Accounting Review 71, 467—492.

Loughran, Tim, and Jay R. Ritter, 1995, The new issues puzzle, Journal of Finance 50, 23–51.

McLean, D., Pontiff, J., 2012. Does academic research destroy stock return predictability? Working paper available at: http://ssrn.com/abstract=2156623.

Newey, W.K., West, K.D., 1987. A simple positive semi–definite, heteroskedasticity and autocorrelation consistent covariance matrix. Econometrica 55, 703–708.

Piotroski, J.D., Roulstone, D.T., 2005. Do insider trades reflect both contrarian beliefs and superior knowledge about future cash flow realizations? Journal of Accounting and Economics 39, 55–81.

Pontiff, Jeffrey, and Artemiza Woodgate, 2008, Share issuance and cross-sectional returns, Journal of Finance 63, 921–945.

Rosenberg, Barr, Kenneth Reid, and Ronald Lanstein, 1985, Persuasive evidence of market inefficiency, Journal of Portfolio Management 11, 9–17.

Rozeff, M.S., Zaman, M.A., 1998. Overreaction and insider trading: Evidence from growth and value portfolios. Journal of Finance 53, 701–16.

Seyhun, H. N., 1990, Overreaction or fundamentals: Some lessons from insiders' response to the market crash of 1987, Journal of Finance 45, 1363–1388.

Shleifer, Andrei and Robert W. Vishny. 1997. The Limits of Arbitrage. Journal of Finance 52(1), pp. 35—55.

Sias, R. W., Starks, L. T., Titman, S., 2006. Changes in institutional ownership and stock returns: assessment and methodology. Journal of Business 79, 2869-2910.

Sias, R., Whidbee, D., 2010. Insider trades and demand by institutional and individual investors. Review of Financial Studies 23, 1544–1595.

Sloan, Richard G., 1996, Do stock prices fully reflect information in accruals and cash flows about future earnings? The Accounting Review 71, 289–315.

Stambaugh, R., J. Yu, and Y. Yuan (2012). The short of it: investor sentiment and anomalies. Journal of Financial Economics 104, 288-302.

Subrahmanyam, A., 2007. Behavioral finance: A review and synthesis. European Financial Management 14, 12-29.

Titman, Sheridan, K.C. John Wei, and Feixue Xie, 2004, Capital investments and stock returns, Journal of Financial and Quantitative Analysis 39, 677–700.

Zhang, X.F., 2006. Information uncertainty and stock returns. Journal of Finance 61, 105–135.

Table 1: Average abnormal returns for portfolios formed using sorts on anomaly variables

Panel A: One-month holding period

Sort on Net Stock Issues, NS

| | Positive | | | | | | Negative | | |
	Hi	4	3	2	Low	Zero	Hi	Low	Hedge
					Equal-weight				
Market	-0.67a	-0.10	0.10	0.07	-0.04	-0.54a	-0.03	0.05	0.72a
Micro	-0.90a	-0.15	0.07	-0.03	-0.13	-0.61a	-0.12	-0.01	0.89a
ABM	-0.40a	-0.04	0.13	0.18a	0.05	-0.26c	0.06	0.13	0.53a
					Value-weight				
Market	-0.25c	-0.24	0.04	0.12	-0.10	-0.22	-0.02	0.09	0.34c
Micro	-0.62b	0.01	0.32	-0.06	-0.07	-0.45b	-0.04	-0.08	0.54b
ABM	-0.23	-0.24	0.04	0.13	-0.10	-0.18	-0.02	0.09	0.32

Sort on Momentum, Mom

	Loser	2	3	4	Winner				Hedge
					Equal-weight				
Market	-0.63a	-0.23a	-0.12	0.10	0.45b				1.08a
Micro	-0.90a	-0.39a	-0.19	0.25	0.60a				1.50a
ABM	-0.22	-0.07	-0.08	-0.00	0.32				0.54
					Value-weight				
Market	-0.29	-0.10	-0.11	-0.10	0.28				0.56
Micro	-0.86a	-0.36b	-0.19	0.25	0.64b				1.50a
ABM	-0.24	-0.09	-0.11	-0.11	0.27				0.51

Sort on Accruals, Ac/B

| | Positive | | | | | Negative | | |
	Hi	4	3	2	Low	Hi	Low	Hedge
					Equal-weight			
Market	-0.35a	-0.07	0.04	-0.04	-0.08	-0.11	-0.07	0.29a
Micro	-0.52a	-0.14	-0.06	-0.12	-0.13	-0.21c	-0.16	0.36a
ABM	-0.04	0.01	0.11	0.02	-0.03	-0.03	0.08	0.12
					Value-weight			
Market	-0.32b	0.05	0.01	-0.09	-0.16	-0.13	0.08	0.40b
Micro	-0.29c	-0.07	-0.03	0.08	-0.26	-0.10	-0.06	0.23c
ABM	-0.32b	0.06	0.01	-0.09	-0.16	-0.13	0.09	0.41b

Sort on Asset Growth, dA/A

| | Positive | | | | | Negative | | |
	Hi	4	3	2	Low	Hi	Low	Hedge
					Equal-weight			
Market	-0.61a	-0.07	0.01	-0.04	-0.05	-0.02	-0.11	0.49a
Micro	-0.88a	-0.26c	-0.09	-0.19	-0.18	-0.07	-0.16	0.72a
ABM	-0.33b	0.09	0.11	0.09	0.07	0.06	-0.02	0.31b
					Value-weight			
Market	-0.19	0.02	0.12	-0.04	-0.14	-0.15	-0.08	0.11
Micro	-0.67a	-0.13	-0.05	-0.13	-0.15	0.05	0.04	0.72a
ABM	-0.17	0.03	0.12	-0.04	-0.14	-0.16	-0.09	0.09

Sort on Profitability, Y/B

| | Negative | | | Positive | | | | | |
	Low	Hi		Low	2	3	4	Hi	Hedge
				Equal-weight					
Market	-0.49a	-0.28a		-0.18b	-0.07	-0.04	-0.01	0.11	0.60b
Micro	-0.51a	-0.33a		-0.29b	-0.11	-0.14	-0.16	0.01	0.52c
ABM	-0.32	-0.15		-0.03	-0.02	0.05	0.08	0.18c	0.50c
				Value-weight					
Market	-0.18	-0.21		-0.14	-0.15	-0.15c	-0.08	0.04	0.23
Micro	-0.26	-0.29		-0.22	-0.05	-0.01	-0.12	0.07	0.33
ABM	-0.14	-0.18		-0.13	-0.15	-0.15c	-0.08	0.05	0.18

Panel B: 12-month holding period

Sort on Net Stock Issues, NS

| | Positive | | | | | | Negative | | |
	Hi	4	3	2	Low	Zero	Hi	Low	Hedge
					Equal-weight				
Market	-6.71a	-0.24	1.99	0.13	-0.25	-4.55a	-0.97	0.32	7.03a
Micro	-8.48a	-0.81	2.15	-0.17	-1.09	-5.10a	-1.43	-0.07	8.42a
ABM	-4.26a	0.76	1.77	0.37	0.70	-2.70c	-0.45	0.92	5.18b
					Value-weight				
Market	-3.05b	-2.00	1.41	0.36	-1.21	-1.85	-0.27	0.70	3.75c
Micro	-7.54a	1.10	3.65	-1.55	-1.76	-4.47b	-1.19	-1.10	6.44a
ABM	-2.77c	-2.07	1.39	0.43	-1.20	-1.52	-0.26	0.74	3.51c

Sort on Momentum, Mom

	Loser	2	3	4	Winner				Hedge
					Equal-weight				
Market	-2.29	-1.44	-1.01	-0.64	-0.11				2.17
Micro	-3.23b	-2.38	-1.38	-0.77	-1.00				2.23
ABM	-0.32	-0.44	-0.69	-0.64	0.97				1.29
					Value-weight				
Market	-0.61	-1.17	-1.45	-1.41	1.55				2.16
Micro	-2.65c	-2.11	-1.38	-1.13	-0.12				2.54
ABM	-0.45	-1.15	-1.45	-1.42	1.70				2.15

Sort on Accruals, Ac/B

| | Positive | | | | | | Negative | | |
	Hi	4	3	2	Low		Hi	Low	Hedge
					Equal-weight				
Market	-3.38a	0.41	0.22	-0.96	-1.45		-1.18	-0.44	2.93a
Micro	-4.91a	-0.06	-0.65	-1.05	-1.97		-1.96	-1.24	3.68a
ABM	-0.50	0.89	0.99	-0.98c	-0.87		-0.53	0.90	1.40
					Value-weight				
Market	-3.30a	1.02	0.76	-0.99	-1.75		-1.52	0.63	3.93a
Micro	-3.85a	0.19	-0.74	-0.49	-3.54		-1.97	-1.17	2.68b
ABM	-3.27a	1.06	0.79	-1.00	-1.72		-1.51	0.74	4.01a

		Positive						Negative		
Sort on Growth of Assets, dA/A	Hi	4	3	2	Low			Hi	Low	Hedge
					Equal-weight					
Market	-4.66a	-1.02	-0.09	-0.56	-0.01			-0.32	-1.02	3.64b
Micro	-6.96a	-3.05c	-0.46	-2.39	-0.40			-0.53	-1.27	5.68b
ABM	-2.17c	0.68	0.33	1.11	0.35			0.10	-0.59	1.58
					Value-weight					
Market	-1.08	1.52	1.00	-0.89	-2.34b			-1.95b	-0.89	0.19
Micro	-5.26a	-1.75	-0.13	-2.70	-1.00			0.05	-0.91	4.36c
ABM	-0.89	1.61	1.02	-0.85	-2.35b			-2.01b	-0.79	0.10

	Negative			Positive					
Sort on Profitability, Y/B	Low	Hi		Low	2	3	4	Hi	Hedge
				Equal-weight					
Market	-3.66c	-2.04		-1.73	-0.65	-0.19	-0.99	0.50	4.16
Micro	-3.68c	-2.39		-2.53	-0.59	-0.41	-2.94	-2.03	1.65
ABM	-2.39	-0.96		-0.53	-0.62	0.02	0.04	1.98c	4.38
				Value-weight					
Market	-1.09	-2.19		-2.09	-2.14b	-1.58c	-1.15	0.79	1.88
Micro	-2.64	-1.89		-2.87	-0.80	-0.10	-2.66	-1.05	1.59
ABM	-0.44	-2.22		-2.06	-2.18b	-1.61b	-1.14	0.81	1.24

The sample covers NYSE/Amex/NASDAQ common stocks from January 1990 to December 2010. We sort stocks on each anomaly variable and order the portfolios from the short legs in the left to the long legs in the right, followed by a hedge portfolio (long minus short). For each portfolio we present the time-series average of the equal- and value-weight BHAR over one- (Panel A) and 12-month (Panel B) holding periods. The rows "Market," "Micro," and "ABM" represent firms in the whole market, microcap firms, and all-but-microcap firms, respectively. Microcap and ABM firms are separated by the 20th NYSE size percentile. Tests on the average BHARs are based on Newey-West standard errors. For momentum we form five quintiles; for profitability, growth of assets, and accruals we form five quintiles for the positives and two equal groups for the negatives; for net stock issues we form five quintiles for the positives, two equal groups for the negatives, and a group for the zeros. The breakpoints are based on ABM firms only. The five anomaly variables and BHAR are defined in the Appendix. Superscripts a, b, and c refer to statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 2: Buy-and-hold abnormal returns (BHAR) for insider trading portfolios for firms in the short legs of the anomalies

	Market				Micro				ABM			
	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m
				Sort on Net Stock Issues, NS								
Silence	173	-1.09a	-5.85a	-10.20a	123	-1.25a	-6.36a	-11.28a	50	-0.74a	-4.58a	-7.80a
Buy	93	-0.23	-1.24c	-1.98c	61	-0.32	-1.49	-2.56c	32	-0.11	-0.80	-0.77
Sell	213	-0.50a	-3.18a	-5.93a	92	-0.75a	-4.49a	-8.82a	121	-0.30b	-2.07a	-3.62a
Buy-Sell		0.27	1.94a	3.96a		0.44c	3.00a	6.26a		0.19	1.26	2.85
		[1.57]	[3.20]	[3.64]		[1.77]	[3.31]	[4.64]		[0.81]	[1.25]	[1.47]
Silence-Sell		-0.59a	-2.67a	-4.26a		-0.49b	-1.87b	-2.46		-0.45b	-2.51a	-4.19b
		[-4.14]	[-4.17]	[-3.15]		[-2.30]	[-2.06]	[-1.49]		[-2.41]	[-2.82]	[-2.14]
				Sort on Momentum, Mom								
Silence	375	-1.09a	-4.51a	-5.23a	282	-1.32a	-5.27a	-6.09a	93	-0.55b	-2.51b	-2.83
Buy	237	-0.03	-0.85	0.59	164	-0.25	-1.28	0.12	74	0.30	-0.14	1.22
Sell	286	-0.54a	-1.80b	-0.37	146	-0.86a	-2.53a	-1.04	140	-0.26	-0.81	0.96
Buy-Sell		0.52a	0.95c	0.97		0.61a	1.25c	1.15		0.57a	0.67	0.26
		[4.12]	[1.96]	[0.85]		[3.69]	[1.90]	[0.83]		[3.30]	[1.17]	[0.19]
Silence-Sell		-0.54a	-2.71a	-4.85a		-0.46a	-2.74a	-5.05a		-0.29c	-1.71a	-3.80a
		[-4.51]	[-5.86]	[-3.71]		[-2.81]	[-5.04]	[-3.13]		[-1.92]	[-3.07]	[-2.81]
				Sort on Accruals, Ac/B								
Silence	186	-0.68a	-3.88a	-6.14a	147	-0.85a	-4.65a	-7.41a	39	-0.29c	-1.71b	-2.43
Buy	98	0.28b	0.83	0.94	72	0.25	0.93	1.01	26	0.31	-0.05	-0.14
Sell	198	-0.33a	-1.75a	-2.49b	103	-0.58a	-3.27a	-5.55a	94	-0.03	-0.12	0.72
Buy-Sell		0.61a	2.58a	3.43b		0.83a	4.20a	6.56a		0.34	0.06	-0.86
		[3.94]	[3.12]	[2.48]		[4.27]	[4.08]	[3.83]		[1.46]	[0.05]	[-0.37]
Silence-Sell		-0.36a	-2.13a	-3.64b		-0.27	-1.37c	-1.86		-0.25	-1.59c	-3.15
		[-2.70]	[-3.27]	[-2.47]		[-1.51]	[-1.71]	[-1.13]		[-1.41]	[-1.77]	[-1.41]

(Table 2 continued)

	Market				Micro				ABM			
	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m
Sort on Asset Growth, dA/A												
Silence	143	-1.02a	-5.24a	-8.04a	95	-1.22a	-6.07a	-9.54a	47	-0.64a	-3.47a	-4.94a
Buy	79	-0.17	-2.47a	-3.34a	49	-0.30	-3.20a	-4.11b	30	-0.05	-1.80b	-2.84c
Sell	228	-0.48a	-2.56a	-2.78b	83	-0.84a	-4.49a	-6.36a	145	-0.28c	-1.42b	-0.69
Buy-Sell		0.31c	0.10	-0.56		0.54a	1.29	2.24		0.23	-0.38	-2.14
		[1.93]	[0.17]	[-0.47]		[2.69]	[1.36]	[1.24]		[0.97]	[-0.42]	[-1.21]
Silence-Sell		-0.54a	-2.68a	-5.26a		-0.39b	-1.58c	-3.19b		-0.36b	-2.05b	-4.24b
		[-3.99]	[-3.76]	[-3.48]		[-2.10]	[-1.85]	[-2.15]		[-1.98]	[-2.48]	[-2.38]
Sort on Profitability, Y/B												
Silence	254	-0.92a	-4.17a	-7.45a	213	-0.97a	-4.11a	-7.21a	41	-0.60b	-3.64b	-7.17a
Buy	121	0.37b	1.33	3.84	99	0.38c	1.55	4.33	22	0.33	0.41	1.87
Sell	185	-0.40c	-1.88	-2.86	116	-0.38	-2.00	-3.63	69	-0.33	-0.85	-0.32
Buy-Sell		0.77a	3.21a	6.70a		0.76a	3.55a	7.96a		0.66b	1.26	2.20
		[4.36]	[4.24]	[5.66]		[3.69]	[4.55]	[5.68]		[2.00]	[0.85]	[0.74]
Silence-Sell		-0.52a	-2.29a	-4.59b		-0.59a	-2.10a	-3.58c		-0.27	-2.79a	-6.84a
		[-3.32]	[-3.55]	[-2.58]		[-3.10]	[-2.61]	[-1.88]		[-1.03]	[-2.75]	[-2.71]

The sample covers NYSE/Amex/NASDAQ common stocks from January 1990 to December 2010. We sort stocks on each anomaly variable. For momentum we form five quintiles; for profitability, growth of assets, and accruals we form five quintiles for the positives and two equal groups for the negatives; for net stock issues we form five quintiles for the positives, two equal groups for the negatives, and a group for the zeros. The breakpoints are based on ABM firms. We retain the short legs only. Within the firms in the short legs we further form portfolios based on their net insider demand (NID) over the past six months. NID is defined in equation (1). Firms with past positive, non-positive, and missing NID form the "buy," "sell," and "silence" portfolios, respectively. For each portfolio we present the time-series average of the equal-weight BHARs over one-, six-, and 12-month holding periods. The spreads between the "buy" and "sell" portfolios and between the "silence" and "sell" portfolios are also presented, together with their Newey-West t-statistics in brackets. The analyses are conducted for all firms in the short legs (Market), microcap firms (Micro), and all-but-micro firms (ABM), respectively. Microcap and ABM firms are separated by the 20th NYSE size percentile. All tests are based on Newey-West standard errors. The five anomaly variables and BHAR are defined in the Appendix. Superscripts a, b, and c represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 3: Monthly alphas for every three-month period following portfolio formation

Three-month period	Market				Micro				ABM			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Sort on Net Stock Issues, NS												
					Equal-weight							
Silence	-1.06a	-1.00a	-0.97a	-0.75a	-1.05a	-0.89a	-0.88a	-0.64b	-0.89a	-1.13a	-1.07a	-0.91a
Buy	-0.33	-0.29	-0.19	-0.13	-0.21	-0.25	-0.10	-0.03	-0.39c	-0.29	-0.22	-0.25
Sell	-0.56a	-0.58a	-0.61a	-0.49a	-0.70a	-0.67a	-0.82a	-0.75a	-0.38a	-0.39b	-0.39b	-0.25
Buy-Sell	0.24	0.29	0.42a	0.36b	0.49b	0.42c	0.71a	0.73a	-0.01	0.11	0.16	0.01
Silence-Sell	-0.50a	-0.42b	-0.36b	-0.26	-0.35	-0.22	-0.06	0.11	-0.51b	-0.74a	-0.69a	-0.66a
					Value-weight							
Silence	-0.43b	-0.69a	-1.01a	-0.81a	-0.88a	-0.90a	-1.09a	-0.82a	-0.31	-0.65a	-0.98a	-0.78a
Buy	-0.30	-0.21	0.24	-0.19	-0.11	-0.33	-0.37	-0.41	-0.28	-0.17	0.34	-0.13
Sell	-0.31b	-0.28b	-0.22	-0.23	-0.49b	-0.51b	-0.73a	-0.78a	-0.29b	-0.25c	-0.19	-0.20
Buy-Sell	0.01	0.07	0.46c	0.04	0.38	0.18	0.37c	0.38	0.01	0.08	0.53c	0.07
Silence-Sell	-0.13	-0.41	-0.79a	-0.58b	-0.39	-0.39c	-0.35	-0.04	-0.02	-0.40	-0.79a	-0.58b
Sort on Momentum, Mom												
					Equal-weight							
Silence	-0.92a	-0.54b	-0.15	0.09	-0.92a	-0.45c	-0.04	0.27	-0.77a	-0.68a	-0.41	-0.28
Buy	-0.20	-0.12	0.21	0.32	-0.16	0.02	0.35	0.44c	-0.21	-0.34	-0.11	0.15
Sell	-0.52b	-0.17	0.10	0.32	-0.55b	-0.08	0.20	0.34	-0.39	-0.15	0.10	0.36
Buy-Sell	0.32a	0.05	0.11	-0.00	0.39a	0.09	0.15	0.10	0.18	-0.19	-0.22	-0.21
Silence-Sell	-0.40a	-0.36b	-0.26c	-0.24c	-0.37a	-0.37b	-0.24	-0.07	-0.38a	-0.53a	-0.52a	-0.65a
					Value-weight							
Silence	-0.55b	-0.42	-0.22	-0.19	-1.06a	-0.57b	-0.25	0.02	-0.45	-0.37	-0.21	-0.17
Buy	-0.04	-0.25	0.06	0.08	-0.16	-0.09	0.14	0.18	-0.03	-0.27	0.03	0.09
Sell	-0.33	-0.21	0.11	0.17	-0.71a	-0.16	0.17	0.21	-0.31	-0.20	0.10	0.18
Buy-Sell	0.29	-0.04	-0.04	-0.09	0.55a	0.06	-0.03	-0.03	0.28	-0.07	-0.07	-0.09
Silence-Sell	-0.22	-0.21	-0.33c	-0.36b	-0.34b	-0.42b	-0.43b	-0.19	-0.14	-0.17	-0.31	-0.35c

Table 3 (continued)

Three-month period	Market				Micro				ABM			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Sort on Accruals, Ac/B												
					Equal-weight							
Silence	-0.63a	-0.56a	-0.31	-0.38c	-0.66a	-0.57a	-0.28	-0.34	-0.54a	-0.52a	-0.39c	-0.46b
Buy	0.26	0.17	-0.00	-0.02	0.39c	0.33	0.09	0.05	-0.09	-0.33	-0.27	-0.16
Sell	-0.31b	-0.25c	-0.21	-0.18	-0.43a	-0.34c	-0.34c	-0.34c	-0.13	-0.11	-0.06	0.01
Buy-Sell	0.57a	0.43a	0.21	0.16	0.81a	0.68a	0.43b	0.39b	0.05	-0.21	-0.21	-0.17
Silence-Sell	-0.32b	-0.31b	-0.09	-0.20	-0.23	-0.23	0.06	0.00	-0.40b	-0.41b	-0.32c	-0.47a
					Value-weight							
Silence	-0.28	-0.21	-0.47b	-0.58a	-0.68a	-0.64a	-0.39c	-0.59a	-0.15	-0.10	-0.46c	-0.56b
Buy	0.16	-0.04	-0.09	-0.07	0.47b	0.21	-0.04	-0.04	0.12	-0.10	-0.11	-0.08
Sell	-0.29c	-0.28	-0.30	-0.33	-0.27	-0.27	-0.46b	-0.58a	-0.27	-0.26	-0.28	-0.30
Buy-Sell	0.45c	0.24	0.21	0.26	0.75a	0.48b	0.42b	0.54b	0.39	0.16	0.17	0.22
Silence-Sell	0.01	0.07	-0.18	-0.25	-0.40c	-0.37c	0.07	-0.01	0.11	0.16	-0.19	-0.25
Sort on Growth of Assets, dA/A												
					Equal-weight							
Silence	-1.02a	-0.82a	-0.59b	-0.55b	-1.03a	-0.73a	-0.54b	-0.47c	-0.85a	-0.84a	-0.61b	-0.61b
Buy	-0.37c	-0.53b	-0.46b	-0.25	-0.38	-0.53b	-0.48b	-0.19	-0.35	-0.52c	-0.44c	-0.27
Sell	-0.49a	-0.45a	-0.35b	-0.13	-0.69a	-0.58a	-0.59a	-0.39c	-0.29c	-0.28c	-0.16	0.04
Buy-Sell	0.12	-0.09	-0.11	-0.12	0.31	0.05	0.11	0.20	-0.06	-0.24	-0.28	-0.30c
Silence-Sell	-0.54a	-0.37b	-0.24	-0.42a	-0.34c	-0.14	0.05	-0.08	-0.55a	-0.56a	-0.45b	-0.65a
					Value-weight							
Silence	-0.63b	-0.83a	-0.54b	-0.59b	-0.96a	-0.69a	-0.66a	-0.62b	-0.56b	-0.81a	-0.50b	-0.54b
Buy	-0.55b	-0.64b	-0.57b	-0.58b	-0.19	-0.33	-0.59a	-0.31	-0.58c	-0.68b	-0.56c	-0.57c
Sell	-0.01	-0.09	-0.02	0.06	-0.57a	-0.49b	-0.46b	-0.38c	0.01	-0.07	-0.00	0.07
Buy-Sell	-0.54c	-0.55c	-0.55c	-0.64b	0.38c	0.16	-0.13	0.08	-0.59c	-0.61c	-0.56c	-0.65b
Silence-Sell	-0.62b	-0.74a	-0.52b	-0.65a	-0.39c	-0.21	-0.20	-0.23	-0.57b	-0.74a	-0.50b	-0.62b

Table 3 (continued)

Three-month period	Market				Micro				ABM			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Sort on Profitability, Y/B												
					Equal-weight							
Silence	-0.84a	-0.74a	-0.63b	-0.53c	-0.79a	-0.60b	-0.49	-0.43	-0.84a	-1.20a	-0.99a	-0.83a
Buy	0.14	0.11	0.21	0.18	0.27	0.21	0.32	0.33	-0.27	-0.19	-0.25	-0.31
Sell	-0.57a	-0.42c	-0.33	-0.37	-0.43c	-0.31	-0.34	-0.48c	-0.52b	-0.26	-0.17	-0.12
Buy-Sell	0.71a	0.53a	0.53a	0.54a	0.69a	0.52a	0.66a	0.81a	0.25	0.08	-0.08	-0.19
Silence-Sell	-0.27c	-0.32b	-0.30c	-0.16	-0.37b	-0.28	-0.14	0.05	-0.32	-0.93a	-0.82a	-0.71a
					Value-weight							
Silence	-0.58b	-0.77b	-0.55c	-0.75b	-0.75a	-0.73a	-0.79a	-0.79a	-0.51	-0.74c	-0.47	-0.67c
Buy	0.07	0.31	0.29	0.06	0.46b	0.29	0.10	0.01	-0.06	0.26	0.29	0.10
Sell	-0.33	-0.07	-0.33	-0.33	-0.41	-0.22	-0.45c	-0.49c	-0.28	0.02	-0.25	-0.25
Buy-Sell	0.39	0.37	0.62c	0.39	0.86a	0.52b	0.55b	0.50c	0.22	0.24	0.54	0.35
Silence-Sell	-0.26	-0.70b	-0.22	-0.42	-0.34	-0.51a	-0.33	-0.31	-0.23	-0.76c	-0.22	-0.42

The sample covers NYSE/Amex/NASDAQ common stocks from January 1990 to December 2010. We sort stocks on each anomaly variable. For momentum we form five quintiles; for profitability, growth of assets, and accruals we form five quintiles for the positives and two equal groups for the negatives; for net stock issues we form five quintiles for the positives, two equal groups for the negatives, and a group for the zeros. The breakpoints are based on ABM firms. We retain the short legs only. Within the firms in the short legs we further form portfolios based on their net insider demand (NID) over the past six months. NID is defined in equation (1). Firms with past positive, non-positive, and missing NID form the "buy," "sell," and "silence" portfolios, respectively. We also form the spread portfolios between the "buy" and "sell" and between the "silence" and "sell" portfolios. Following the formation of each portfolio, we form calendar time equal- and value-weight portfolios of the stock returns over a three-month period and regress the excess returns on the Fama and French (1993) three factors and retain the intercepts as the average monthly alpha for the three-month period. We estimate average alphas for the four three-month periods following portfolio formation. The analyses are conducted for all firms in the short legs (Market), microcap firms (Micro), and all-but-micro firms (ABM), respectively. Microcap and ABM firms are separated by the 20th NYSE size percentile. The five anomaly variables and BHAR are defined in the Appendix. Superscripts a, b, and c represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Insider trading activity measured during alternative periods
Panel A: Insider trading activity measured over the prior 12 months

	Market				Micro				ABM			
	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m
				Sort on Net Stock Issues, NS								
Silence	105	-1.37a	-7.32a	-13.01a	79	-1.48a	-7.58a	-13.82a	27	-1.22a	-7.13a	-11.59a
Buy	108	-0.32b	-1.20c	-2.11	76	-0.43b	-1.61c	-2.83c	33	-0.21	-0.66	-0.77
Sell	265	-0.52a	-3.37a	-6.09a	121	-0.79a	-4.76a	-9.02a	144	-0.30b	-2.22a	-3.68a
Buy-Sell		0.20	2.17a	3.98a		0.36c	3.15a	6.19a		0.10	1.56	2.91
		[1.46]	[3.45]	[3.11]		[1.80]	[4.24]	[4.73]		[0.48]	[1.35]	[1.27]
Silence-Sell		-0.85a	-3.95a	-6.92a		-0.69a	-2.82a	-4.80a		-0.92a	-4.91a	-7.91a
		[-4.76]	[-5.88]	[-5.18]		[-2.85]	[-3.64]	[-3.71]		[-3.51]	[-3.73]	[-2.99]
				Sort on Momentum, Mom								
Silence	225	-1.42a	-5.95a	-7.44a	178	-1.59a	-6.58a	-8.12a	47	-0.91a	-3.89b	-4.98
Buy	254	-0.29	-1.18	0.13	186	-0.44b	-1.63c	-0.30	68	0.02	-0.13	1.04
Sell	420	-0.45b	-1.92b	-0.83	228	-0.80a	-2.94a	-2.13	191	-0.13	-0.79	0.73
Buy-Sell		0.16	0.74	0.96		0.36a	1.31b	1.83c		0.15	0.66	0.31
		[1.44]	[1.59]	[0.94]		[2.80]	[2.15]	[1.66]		[0.94]	[0.97]	[0.25]
Silence-Sell		-0.97a	-4.03a	-6.62a		-0.79a	-3.64a	-5.99a		-0.78a	-3.10a	-5.71b
		[-6.74]	[-7.62]	[-5.01]		[-5.04]	[-6.36]	[-4.79]		[-3.63]	[-2.99]	[-2.42]
				Sort on Accruals, Ac/B								
Silence	116	-1.05a	-5.25a	-8.78a	95	-1.19a	-5.86a	-9.67a	21	-0.60a	-2.86a	-5.01b
Buy	118	0.16	0.14	0.10	92	0.15	0.06	0.08	26	0.14	0.07	-0.71
Sell	248	-0.29a	-1.77a	-2.39b	135	-0.57a	-3.25a	-5.18a	112	0.02	-0.15	0.79
Buy-Sell		0.45a	1.91a	2.48c		0.72a	3.32a	5.27a		0.11	0.22	-1.50
		[3.22]	[2.75]	[1.86]		[4.04]	[3.53]	[2.82]		[0.47]	[0.21]	[-0.66]
Silence-Sell		-0.77a	-3.48a	-6.40a		-0.62a	-2.61a	-4.48a		-0.62a	-2.71a	-5.80b
		[-5.34]	[-5.06]	[-4.42]		[-3.32]	[-3.09]	[-2.73]		[-2.80]	[-2.61]	[-2.25]
				Sort on Asset Growth, dA/A								
Silence	83	-1.30a	-6.50a	-10.48a	58	-1.43a	-7.16a	-11.67a	25	-0.98a	-4.41a	-6.49a
Buy	87	-0.43a	-3.15a	-4.11a	58	-0.58a	-3.85a	-4.89a	29	-0.26	-2.17b	-3.11c
Sell	280	-0.46a	-2.59a	-2.89b	111	-0.77a	-4.30a	-6.06a	169	-0.25c	-1.44b	-0.80
Buy-Sell		0.03	-0.56	-1.21		0.20	0.46	1.16		-0.01	-0.74	-2.31
		[0.17]	[-0.95]	[-0.88]		[1.07]	[0.52]	[0.71]		[-0.03]	[-0.82]	[-1.21]
Silence-Sell		-0.84a	-3.92a	-7.59a		-0.65a	-2.86a	-5.61a		-0.73a	-2.97b	-5.69b
		[-5.11]	[-5.61]	[-4.68]		[-3.18]	[-3.74]	[-3.50]		[-2.68]	[-2.52]	[-2.31]

				Sort on Profitability, Y/B							
Silence	169	-1.11a	-5.59a	-9.33a	144	-1.11a	-5.58a	-9.10a	24	-1.01a	-4.71b	-9.09a
Buy	161	0.14	1.13	2.29	134	0.13	1.41	2.87	27	0.13	-0.15	0.04
Sell	231	-0.41b	-2.09c	-3.09	149	-0.45b	-2.39b	-3.96c	82	-0.26	-1.00	-0.76
Buy-Sell		0.55a	3.21a	5.38a		0.59a	3.80a	6.83a		0.39	0.85	0.80
		[3.64]	[4.30]	[3.88]		[3.50]	[4.48]	[4.25]		[1.33]	[0.65]	[0.30]
Silence-Sell		-0.70a	-3.51a	-6.24a		-0.66a	-3.19a	-5.14a		-0.76b	-3.71a	-8.33a
		[-3.91]	[-5.31]	[-3.76]		[-3.04]	[-4.08]	[-2.89]		[-2.55]	[-2.97]	[-3.31]

Panel B: Insider trading activity measured over the prior three months

	Market				Micro				ABM			
	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m
					Sort on Net Stock Issues, NS							
Silence	253	-0.88a	-5.02a	-8.66a	169	-1.10a	-5.72a	-9.96a	84	-0.50a	-3.53a	-6.20a
Buy	67	0.07	-0.66	-1.81c	42	-0.11	-1.03	-2.88b	25	0.25	0.13	0.36
Sell	159	-0.55a	-3.01a	-5.55a	65	-0.83a	-4.44a	-8.44a	94	-0.36b	-1.94a	-3.34a
Buy-Sell		0.62a	2.35a	3.74a		0.73b	3.41a	5.57a		0.60b	2.07c	3.70c
		[2.72]	[3.02]	[3.38]		[2.38]	[2.79]	[3.34]		[2.09]	[1.84]	[1.96]
Silence-Sell		-0.33b	-2.01a	-3.11a		-0.27	-1.28	-1.52		-0.14	-1.59b	-2.86c
		[-2.39]	[-3.58]	[-2.98]		[-1.20]	[-1.37]	[-0.93]		[-0.80]	[-2.00]	[-1.87]
					Sort on Momentum, Mom							
Silence	536	-0.81a	-3.67a	-3.96b	384	-1.10a	-4.42a	-4.88a	152	-0.31	-1.95c	-1.76
Buy	175	0.18	-0.39	1.25	116	0.01	-0.79	0.94	58	0.42c	0.23	1.44
Sell	188	-0.77a	-1.65c	-0.01	92	-1.24a	-2.66a	-1.09	96	-0.33	-0.49	1.49
Buy-Sell		0.95a	1.27b	1.26		1.25a	1.87c	2.03		0.76a	0.72	-0.05
		[6.94]	[1.98]	[0.79]		[5.39]	[1.89]	[0.99]		[3.95]	[1.03]	[-0.03]
Silence-Sell		-0.05	-2.02a	-3.95a		0.14	-1.76b	-3.79c		0.03	-1.46b	-3.25a
		[-0.40]	[-3.84]	[-2.92]		[0.68]	[-2.19]	[-1.93]		[0.20]	[-2.55]	[-2.83]
					Sort on Accruals, Ac/B							
Silence	266	-0.59a	-3.18a	-4.92a	200	-0.78a	-3.83a	-6.27a	66	-0.16	-1.69b	-1.71
Buy	71	0.59a	1.43c	1.90	50	0.57a	1.16	1.89	21	0.61a	1.63	1.54
Sell	145	-0.29b	-1.51b	-2.32c	72	-0.45b	-3.07a	-5.47a	73	-0.08	-0.03	0.55
Buy-Sell		0.88a	2.94a	4.22a		1.03a	4.23a	7.35a		0.69a	1.66	0.99
		[4.85]	[3.62]	[2.77]		[4.24]	[4.40]	[4.09]		[2.65]	[1.36]	[0.42]
Silence-Sell		-0.30b	-1.67b	-2.60c		-0.32	-0.76	-0.80		-0.08	-1.66b	-2.26
		[-2.09]	[-2.46]	[-1.80]		[-1.56]	[-0.94]	[-0.49]		[-0.49]	[-1.99]	[-1.13]

		Market				Micro				ABM		
			Sort on Asset Growth, dA/A									
Silence	217	-0.79a	-4.56a	-6.61a	134	-1.08a	-5.61a	-8.25a	83	-0.37b	-2.93a	-4.12a
Buy	60	-0.09	-1.61b	-1.99	35	-0.27	-2.41b	-2.83	25	0.06	-0.79	-1.18
Sell	173	-0.52a	-2.50a	-2.74c	59	-0.89a	-4.54a	-6.66a	114	-0.34b	-1.40c	-0.59
Buy-Sell		0.43b	0.89	0.75		0.61b	2.13c	3.83c		0.40	0.61	-0.59
		[2.24]	[1.34]	[0.52]		[2.36]	[1.88]	[1.86]		[1.53]	[0.62]	[-0.34]
Silence-Sell		-0.27b	-2.06a	-3.87a		-0.20	-1.07	-1.59		-0.03	-1.53b	-3.53a
		[-1.99]	[-3.23]	[-3.22]		[-0.97]	[-1.32]	[-1.18]		[-0.20]	[-2.13]	[-2.63]
			Sort on Profitability, Y/B									
Silence	343	-0.74a	-3.47a	-5.67a	280	-0.81a	-3.54a	-5.61a	63	-0.38	-2.39	-4.77c
Buy	81	0.69a	2.02c	4.48c	65	0.81a	2.50b	5.00c	16	0.22	-0.02	2.39
Sell	135	-0.40c	-1.37	-2.47	83	-0.45	-1.33	-3.03	53	-0.36	-0.77	-0.34
Buy-Sell		1.09a	3.39a	6.95a		1.27a	3.82a	8.03a		0.58	0.75	2.73
		[4.74]	[3.81]	[4.80]		[4.64]	[4.07]	[5.13]		[1.55]	[0.45]	[0.88]
Silence-Sell		-0.34b	-2.10a	-3.20c		-0.35	-2.21b	-2.58		-0.03	-1.62	-4.43b
		[-2.17]	[-2.68]	[-1.89]		[-1.63]	[-2.32]	[-1.29]		[-0.12]	[-1.58]	[-2.02]

The sample covers NYSE/Amex/NASDAQ common stocks from January 1990 to December 2010. We sort stocks on each anomaly variable. For momentum we form five quintiles; for profitability, growth of assets, and accruals we form five quintiles for the positives and two equal groups for the negatives; for net stock issues we form five quintiles for the positives, two equal groups for the negatives, and a group for the zeros. The breakpoints are based on ABM firms. We retain the short legs only. Within the firms in the short legs we further form portfolios based on their net insider demand (NID) over the past 12 (Panel A) or three (Panel B) months. NID is defined in equation (1). Firms with past positive, non-positive, and missing NID form the "buy," "sell," and "silence" portfolios, respectively. For each portfolio we present the time-series average of the equal-weight BHARs over one-, six-, and 12-month holding periods. The spreads between the portfolios are presented together with their t-statistics in brackets. The analyses are based on all (Market), microcap (Micro), and all-but-micro (ABM) firms, respectively. Microcap and ABM firms are separated by the 20th NYSE size percentile. All tests are based on Newey-West standard errors. The five anomaly variables and BHAR are defined in the Appendix. Superscripts a, b, and c represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5: Alternative definitions of anomaly variables

	Market				Micro				ABM			
	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m
					Sort on Net Stock Issues, NS12							
Silence	191	-1.01a	-6.18a	-11.23a	140	-1.09a	-6.86a	-12.72a	51	-0.79a	-4.43a	-7.60a
Buy	97	-0.12	-1.17c	-2.08c	66	-0.11	-0.72	-1.97	31	-0.30	-2.33a	-2.36
Sell	250	-0.58a	-3.66a	-6.58a	117	-0.79a	-5.49a	-10.05a	133	-0.38b	-2.28a	-4.10a
Buy-Sell		0.46b	2.49a	4.50a		0.68a	4.77a	8.08a		0.08	-0.05	1.74
		[2.42]	[3.73]	[3.76]		[3.10]	[3.87]	[3.99]		[0.31]	[-0.05]	[0.91]
Silence-Sell		-0.43a	-2.52a	-4.65a		-0.30	-1.37	-2.67b		-0.41b	-2.16b	-3.50c
		[-2.83]	[-3.87]	[-4.24]		[-1.34]	[-1.36]	[-2.02]		[-2.38]	[-2.55]	[-1.85]
					Sort on Net Stock Issues, NS6							
Silence	184	-0.78a	-5.47a	-9.88a	137	-0.81a	-5.88a	-10.96a	47	-0.67a	-4.19a	-6.86a
Buy	91	-0.00	-0.74	-1.51	64	0.07	-0.32	-1.22	27	-0.10	-1.31	-2.27
Sell	266	-0.34c	-2.42a	-5.12a	129	-0.38c	-2.89b	-7.35a	138	-0.25	-1.65b	-2.94b
Buy-Sell		0.34c	1.69b	3.60a		0.45c	2.57b	6.13a		0.15	0.34	0.68
		[1.80]	[2.14]	[3.01]		[1.92]	[2.29]	[3.58]		[0.60]	[0.30]	[0.36]
Silence-Sell		-0.44a	-3.05a	-4.77a		-0.43b	-2.99b	-3.60c		-0.42b	-2.54a	-3.92a
		[-3.18]	[-4.07]	[-3.78]		[-2.09]	[-2.45]	[-1.91]		[-2.26]	[-3.45]	[-2.61]
					Sort on Momentum, Mom6							
Silence	327	-0.98a	-5.16a	-7.30a	244	-1.22a	-6.04a	-8.49a	83	-0.51b	-3.18a	-4.52b
Buy	191	0.02	-1.61c	-1.09	127	-0.17	-2.25a	-1.87	63	0.24	-0.63	-0.24
Sell	312	-0.42b	-2.60a	-2.56b	152	-0.79a	-4.07a	-4.18a	160	-0.13	-1.27c	-0.91
Buy-Sell		0.44a	0.99c	1.47		0.61a	1.82b	2.31c		0.37c	0.63	0.67
		[3.04]	[1.76]	[1.50]		[3.36]	[2.47]	[1.86]		[1.89]	[0.92]	[0.55]
Silence-Sell		-0.56a	-2.56a	-4.74a		-0.43b	-1.97a	-4.31a		-0.38b	-1.91a	-3.61a
		[-4.61]	[-5.75]	[-4.56]		[-2.40]	[-3.83]	[-3.58]		[-2.29]	[-3.20]	[-2.98]

Table 5 (Continued)

					Sort on Asset Growth, AG							
Silence	155	-0.99a	-5.26a	-8.21a	105	-1.19a	-5.93a	-9.52a	50	-0.62a	-3.73a	-5.37a
Buy	85	-0.20	-2.51a	-3.68a	53	-0.34	-3.17a	-4.61a	32	-0.08	-1.96b	-2.88b
Sell	238	-0.56a	-3.06a	-4.02a	91	-0.94a	-4.92a	-7.77a	147	-0.34b	-1.84b	-1.61
Buy-Sell		0.36b	0.56	0.34		0.60a	1.76b	3.17c		0.26	-0.12	-1.28
		[2.17]	[0.85]	[0.26]		[2.75]	[1.99]	[1.93]		[1.13]	[-0.14]	[-0.72]
Silence-Sell		-0.43a	-2.19a	-4.19a		-0.25	-1.01	-1.74		-0.28	-1.89b	-3.76b
		[-3.34]	[-3.20]	[-2.86]		[-1.35]	[-1.28]	[-1.21]		[-1.54]	[-2.43]	[-2.01]
					Sort on Investment, Inv							
Silence	169	-0.82a	-3.79a	-5.47a	115	-1.04a	-4.43a	-6.33a	54	-0.40b	-2.61a	-3.99b
Buy	98	-0.20	-1.70b	-0.82	62	-0.35c	-2.24b	-0.99	37	0.07	-1.07	-1.09
Sell	247	-0.33a	-1.72a	-2.89b	94	-0.62a	-3.44a	-6.23a	153	-0.13	-0.65	-0.90
Buy-Sell		0.13	0.02	2.07b		0.26	1.20c	5.24a		0.20	-0.42	-0.19
		[0.90]	[0.04]	[2.48]		[1.36]	[1.80]	[4.44]		[0.98]	[-0.53]	[-0.14]
Silence-Sell		-0.49a	-2.07a	-2.57c		-0.43b	-1.00	-0.11		-0.26	-1.96b	-3.09c
		[-3.83]	[-3.11]	[-1.82]		[-2.37]	[-1.01]	[-0.05]		[-1.55]	[-2.44]	[-1.74]

The sample covers NYSE/Amex/NASDAQ common stocks from January 1990 to December 2010. We sort stocks on each anomaly variable. For momentum we form five quintiles; for asset growth and investment we form five quintiles for the positives and two equal groups for the negatives; for NS12 and NS6 we form five quintiles for the positives, two equal groups for the negatives, and a group for the zeros. The breakpoints are based on ABM firms. The sample includes the short legs only. Within the firms in the short legs we further form portfolios based on their net insider demand (NID) over the past six months. NID is defined in equation (1). Firms with past positive, non-positive, and missing NID form the "buy," "sell," and "silence" portfolios, respectively. For each portfolio we present the time-series average of the equal-weight BHARs over one-, six-, and 12-month holding periods. The spreads between the portfolios are presented together with their t-statistics in brackets. The analyses are based on all (Market), microcap (Micro), and all-but-micro (ABM) firms, respectively. Microcap and ABM firms are separated by the 20th NYSE size percentile. All tests are based on Newey-West standard errors. The five anomaly variables and BHAR are defined in the Appendix. Superscripts a, b, and c represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6: Institutional ownership, analysts following, and volatility, and insider silence

Anomalies	1 m	6 m	12 m	1 m	6 m	12 m	1 m	6 m	12 m
	Low IO			High IO			T(High - Low)		
Net Stock Issues	-1.65a	-8.77a	-13.95a	-0.71a	-3.44a	-6.49a	[3.45]	[4.66]	[2.98]
Momentum	-1.46a	-6.14a	-7.99a	-0.85a	-3.77a	-5.04a	[2.77]	[2.85]	[1.72]
Accruals	-0.95a	-6.05a	-9.23a	-0.56a	-3.17a	-6.05a	[1.37]	[3.21]	[1.63]
Asset Growth	-1.21a	-6.61a	-9.97a	-0.74a	-3.83a	-5.85b	[1.87]	[3.22]	[1.82]
Profitability	-1.68a	-8.31a	-14.30a	-0.48b	-1.90	-4.85c	[4.35]	[4.51]	[3.09]
	Few analysts			Many analysts			T(Many - Few)		
Net Stock Issues	-1.20a	-6.30a	-10.90a	-0.67a	-3.99a	-6.84a	[2.39]	[2.41]	[2.39]
Momentum	-1.02a	-4.45a	-5.57a	-0.88a	-4.15a	-4.49a	[0.48]	[0.34]	[0.62]
Accruals	-0.73a	-4.32a	-7.62a	-0.45b	-2.28a	-2.92b	[0.92]	[2.01]	[2.54]
Asset Growth	-1.07a	-5.50a	-10.03a	-1.00a	-4.51a	-5.53a	[0.36]	[1.05]	[2.40]
Profitability	-0.89a	-5.45a	-10.76a	-0.28	-1.36	-2.07	[1.62]	[2.32]	[3.08]
	High volatility			Low volatility			T(Low - High)		
Net Stock Issues	-1.65a	-8.46a	-13.90a	-0.74a	-4.00a	-7.41a	[2.21]	[2.53]	[1.94]
Momentum	-1.70a	-6.23a	-6.82b	-0.61a	-3.83a	-5.14a	[3.73]	[1.39]	[0.54]
Accruals	-0.89a	-4.99a	-7.40a	-0.56a	-3.75a	-6.18a	[1.02]	[0.77]	[0.39]
Asset Growth	-1.70a	-7.43a	-10.76a	-0.57a	-3.62a	-5.80a	[3.15]	[1.87]	[1.43]
Profitability	-1.19a	-5.40a	-10.95a	-0.77a	-3.07a	-5.16a	[1.05]	[1.46]	[1.85]

The sample covers NYSE/Amex/NASDAQ common stocks from January 1990 to December 2010. We sort stocks on each anomaly variable. For momentum we form five quintiles; for profitability, growth of assets, and accruals we form five quintiles for the positives and two equal groups for the negatives; for net stock issues we form five quintiles for the positives, two equal groups for the negatives, and a group for the zeros. The breakpoints are based on ABM firms. We retain firms in the short legs whose insiders do not trade over the past six months. We then sort these firms into microcap (below the 20th NYSE size percentile), small (between the 20th and 50th NYSE size percentiles), and large (above the 50th NYSE size percentile) and within each size group we sort firms into terciles by each variable (IO, Analysts, and Volatility). These terciles are then pooled across the size groups. For firms in the terciles we calculate the time-series average of the equal-weight BHARs over the one-, six-, and 12-month holding periods. The three variables (IO, Analysts, and Volatility) and the five anomaly variables are all defined in the Appendix. The table reports the BHARs for the two extreme terciles and the t-statistics testing equal means between the two extreme groups. All tests are based on Newey-West standard errors. Superscripts a, b, and c represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7: Insider silence and litigation risk

Anomalies	1 m	6 m	12 m	1 m	6 m	12 m
	Low litigation risk			High litigation risk		
Net Stock Issues	-0.88a	-5.19a	-9.18a	-1.28a	-7.82a	-14.04a
Momentum	-1.01a	-3.94a	-5.35a	-1.13a	-5.04a	-5.49b
Accruals	-0.73a	-3.17a	-5.49b	-0.65a	-4.51a	-7.27a
Asset Growth	-0.65a	-4.25a	-6.88a	-1.32a	-7.20a	-10.48a
Profitability	-0.84a	-3.76a	-6.83a	-0.89a	-4.63a	-7.26b

The sample covers NYSE/Amex/NASDAQ common stocks from January 1990 to December 2010. We sort stocks on each anomaly variable. For momentum we form five quintiles; for profitability, growth of assets, and accruals we form five quintiles for the positives and two equal groups for the negatives; for net stock issues we form five quintiles for the positives, two equal groups for the negatives, and a group for the zeros. The breakpoints are based on ABM firms. We retain firms in the short legs whose insiders do not trade over the past six months. We then sort these firms into two groups on their measure of litigation risk (Kim and Skinner, 2012). For each portfolio we calculate the time-series average of the equal-weight BHARs over the one-, six-, and 12-month holding periods. The five anomaly variables and the measure of litigation risk (KS) are all defined in the Appendix. All tests are based on Newey-West standard errors. Superscripts a, b, and c represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8: Regulated insider trading and the long legs of the anomalies

	Market				Micro				ABM			
	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m	Avg. N	1 m	6 m	12 m
					Sort on Net Stock Issues, NS							
Silence	123	-0.07	-0.41	-1.32	79	-0.12	-0.56	-1.75	44	-0.01	-0.01	-0.15
Buy	64	0.27c	1.49	3.19b	36	0.24	1.49	4.14b	28	0.26	0.94	0.76
Sell	179	0.07	0.34	1.00	53	-0.04	-0.52	-0.10	126	0.14	0.73	1.63
Buy-Sell		0.20	1.15	2.19		0.28	2.00	4.24c		0.12	0.21	-0.87
		[1.25]	[1.16]	[1.28]		[1.16]	[1.47]	[1.72]		[0.68]	[0.21]	[-0.51]
Silence-Buy		-0.34b	-1.90b	-4.51a		-0.36c	-2.05	-5.88b		-0.27	-0.94	-0.90
		[-2.14]	[-2.12]	[-2.74]		[-1.69]	[-1.64]	[-2.19]		[-1.36]	[-1.15]	[-0.65]
Silence-Sell		-0.14	-0.74	-2.32c		-0.08	-0.05	-1.64		-0.15	-0.74	-1.78
		[-1.28]	[-1.20]	[-1.84]		[-0.43]	[-0.05]	[-0.92]		[-1.15]	[-1.06]	[-1.31]
					Sort on Momentum, Mom							
Silence	231	0.33	-0.13	-3.40c	176	0.42c	0.01	-3.67c	56	0.20	-0.53	-2.71
Buy	90	1.19a	4.05a	4.80b	68	1.51a	5.30a	6.36b	22	0.43c	0.30	0.58
Sell	416	0.37c	0.89	0.87	188	0.41	0.03	-1.11	229	0.37	1.44	2.27
Buy-Sell		0.82a	3.16a	3.93a		1.09a	5.26a	7.47a		0.06	-1.14	-1.69
		[5.66]	[4.78]	[3.24]		[5.77]	[7.21]	[6.73]		[0.25]	[-1.26]	[-0.96]
Silence-Buy		-0.86a	-4.18a	-8.20a		-1.09a	-5.29a	-10.03a		-0.23	-0.83	-3.29b
		[-5.65]	[-6.37]	[-6.85]		[-6.18]	[-6.12]	[-5.86]		[-0.94]	[-0.84]	[-2.27]
Silence-Sell		-0.04	-1.02b	-4.27a		0.00	-0.03	-2.56		-0.17	-1.97a	-4.98a
		[-0.31]	[-2.03]	[-3.19]		[0.01]	[-0.04]	[-1.55]		[-1.11]	[-3.45]	[-4.21]
					Sort on Accruals, Ac/B							
Silence	297	-0.30a	-1.26c	-2.76b	225	-0.37a	-1.53b	-3.23b	72	-0.06	-0.24	-1.29
Buy	152	0.32a	0.87	3.16b	108	0.28c	0.65	3.20c	44	0.42a	1.17c	3.06a
Sell	328	-0.04	-0.21	-0.26	145	-0.21	-1.13	-2.37c	183	0.09	0.51	1.45
Buy-Sell		0.36a	1.08	3.42a		0.49a	1.78b	5.56a		0.33c	0.66	1.61
		[2.82]	[1.60]	[2.85]		[2.84]	[2.52]	[3.70]		[1.90]	[0.69]	[0.95]
Silence-Buy		-0.62a	-2.14a	-5.92a		-0.64a	-2.18a	-6.42a		-0.48b	-1.41	-4.34a
		[-4.44]	[-3.03]	[-4.93]		[-3.89]	[-2.75]	[-4.14]		[-2.52]	[-1.42]	[-2.70]
Silence-Sell		-0.26b	-1.06a	-2.50a		-0.16	-0.40	-0.86		-0.14	-0.75	-2.73b
		[-2.42]	[-2.74]	[-2.99]		[-1.00]	[-0.71]	[-1.31]		[-0.96]	[-1.22]	[-2.24]

		Market				Micro				ABM		
Sort on Growth of Assets, dA/A												
Silence	264	-0.44a	-1.77c	-3.82a	216	-0.54a	-1.87c	-3.82b	48	-0.21	-1.45c	-3.79b
Buy	130	0.47a	2.02a	4.21b	101	0.49a	1.97b	4.49c	29	0.39c	1.96b	2.51
Sell	214	-0.03	-0.31	-0.68	121	-0.08	-0.78	-1.60	93	-0.01	0.26	0.54
Buy-Sell		0.50a	2.34a	4.89a		0.57b	2.75a	6.09a		0.39c	1.70	1.97
		[2.84]	[3.10]	[3.68]		[2.50]	[2.76]	[3.53]		[1.76]	[1.55]	[0.79]
Silence-Buy		-0.91a	-3.79a	-8.03a		-1.03a	-3.85a	-8.32a		-0.60b	-3.41a	-6.30a
		[-5.69]	[-5.40]	[-6.12]		[-5.76]	[-5.14]	[-5.37]		[-2.59]	[-3.57]	[-3.43]
Silence-Sell		-0.41a	-1.46a	-3.14b		-0.46b	-1.10	-2.23		-0.20	-1.71b	-4.33b
		[-2.93]	[-3.03]	[-2.01]		[-2.35]	[-1.61]	[-1.09]		[-1.20]	[-2.22]	[-2.07]
Sort on Profitability, Y/B												
Silence	118	-0.01	-1.00	-1.55	68	-0.04	-2.06	-3.23	51	-0.03	-0.04	0.08
Buy	63	0.31	0.60	1.26	33	0.29	0.26	0.45	30	0.24	0.70	1.77
Sell	235	0.11	0.48	1.41	63	-0.18	-1.71	-2.98	173	0.21c	1.15c	2.72b
Buy-Sell		0.19	0.12	-0.15		0.47c	1.97c	3.43c		0.04	-0.45	-0.95
		[1.16]	[0.14]	[-0.10]		[1.92]	[1.71]	[1.76]		[0.19]	[-0.44]	[-0.48]
Silence-Buy		-0.32c	-1.61b	-2.81c		-0.34	-2.32b	-3.68c		-0.27	-0.74	-1.69
		[-1.87]	[-2.05]	[-1.90]		[-1.39]	[-2.09]	[-1.94]		[-1.31]	[-0.72]	[-1.00]
Silence-Sell		-0.12	-1.49b	-2.96b		0.14	-0.35	-0.25		-0.24c	-1.19c	-2.64b
		[-0.99]	[-2.47]	[-2.56]		[0.63]	[-0.39]	[-0.17]		[-1.68]	[-1.81]	[-1.99]

The sample covers NYSE/Amex/NASDAQ common stocks from January 1990 to December 2010. We sort stocks on each anomaly variable. For momentum we form five quintiles; for profitability, growth of assets, and accruals we form five quintiles for the positives and two equal groups for the negatives; for net stock issues we form five quintiles for the positives, two equal groups for the negatives, and a group for the zeros. The breakpoints are based on ABM firms. We retain the long legs only. Within the firms in the long legs we further form portfolios based on their net insider demand (NID) over the past six months. NID is defined in equation (1). Firms with past positive, non-positive, and missing NID form the "buy," "sell," and "silence" portfolios, respectively. For each portfolio we present the time-series average of the equal-weight BHARs over one-, six-, and 12-month holding periods. The spreads between the "buy" and "sell" portfolios and between the "silence" and "sell" portfolios are also presented, together with their Newey-West t-statistics in brackets. The analyses are conducted for all firms in the long legs (Market), microcap firms (Micro), and all-but-micro firms (ABM), respectively. Microcap and ABM firms are separated by the 20th NYSE size percentile. All tests are based on Newey-West standard errors. The five anomaly variables and BHAR are defined in the Appendix. Superscripts a, b, and c represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Figure 1: Buy-and-hold abnormal returns (BHAR) of insider trading portfolios in the short leg of net stock issues
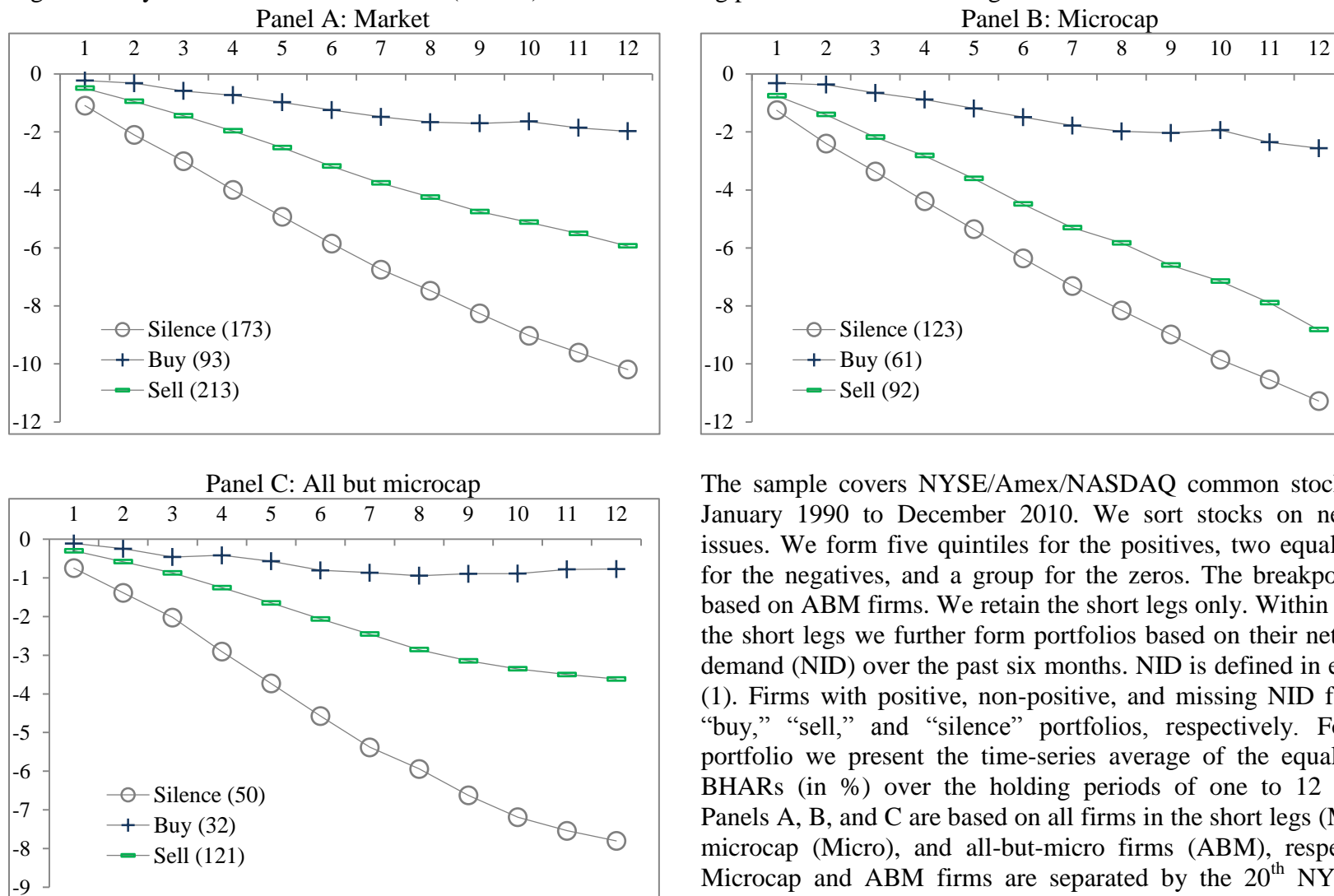
Panel A: Market

Panel B: Microcap
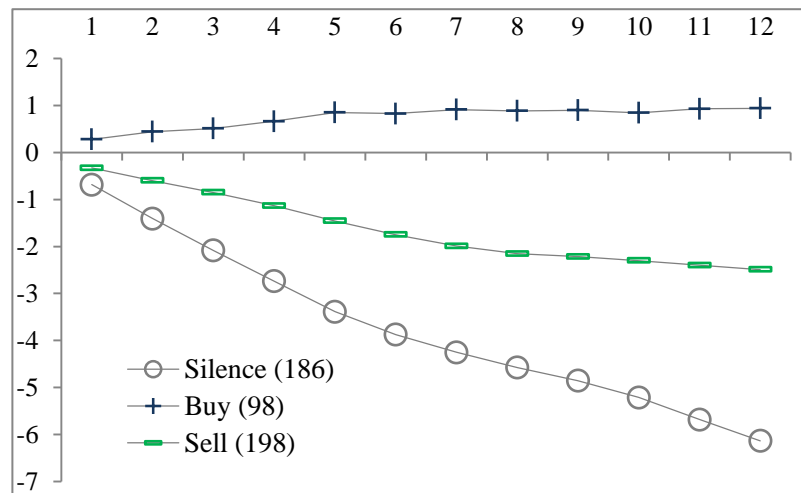

Panel C: All but microcap

The sample covers NYSE/Amex/NASDAQ common stocks from January 1990 to December 2010. We sort stocks on net stock issues. We form five quintiles for the positives, two equal groups for the negatives, and a group for the zeros. The breakpoints are based on ABM firms. We retain the short legs only. Within firms in the short legs we further form portfolios based on their net insider demand (NID) over the past six months. NID is defined in equation (1). Firms with positive, non-positive, and missing NID form the "buy," "sell," and "silence" portfolios, respectively. For each portfolio we present the time-series average of the equal-weight BHARs (in %) over the holding periods of one to 12 months. Panels A, B, and C are based on all firms in the short legs (Market), microcap (Micro), and all-but-micro firms (ABM), respectively. Microcap and ABM firms are separated by the 20th NYSE size percentile. The anomaly variable (net stock issues) is defined in the Appendix. Average portfolio sizes are shown in parentheses.

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Figure 2: BHARs of insider trading portfolios in short legs of momentum, accruals, growth of assets, and profitability
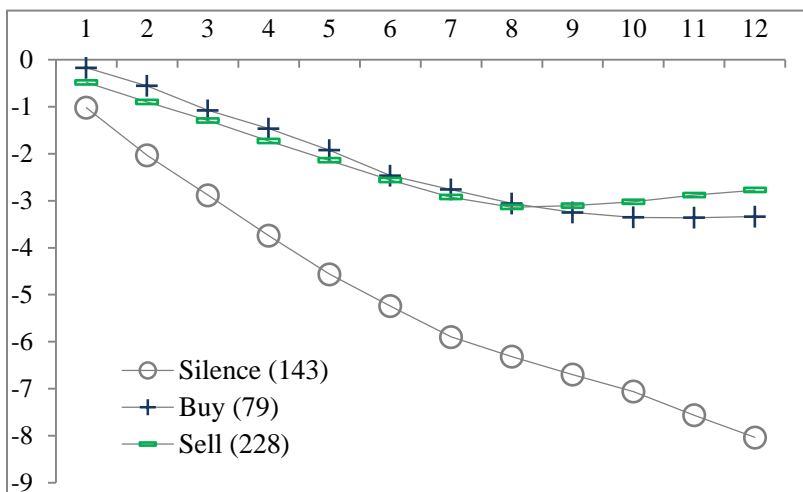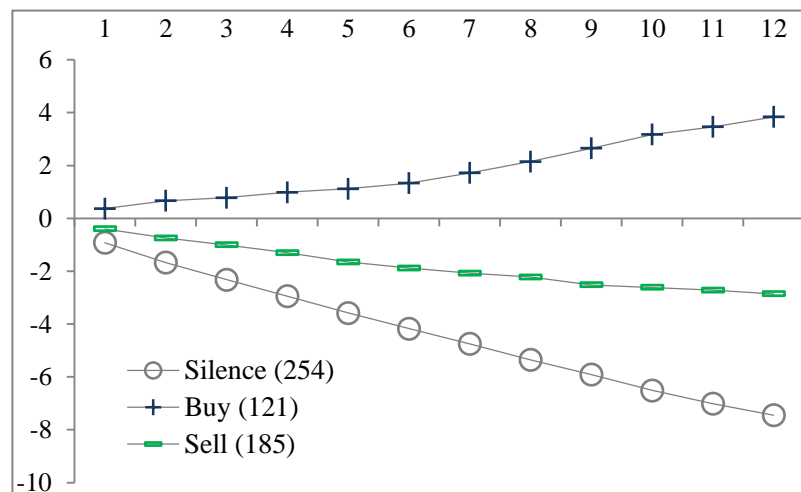
Momentum, Mom
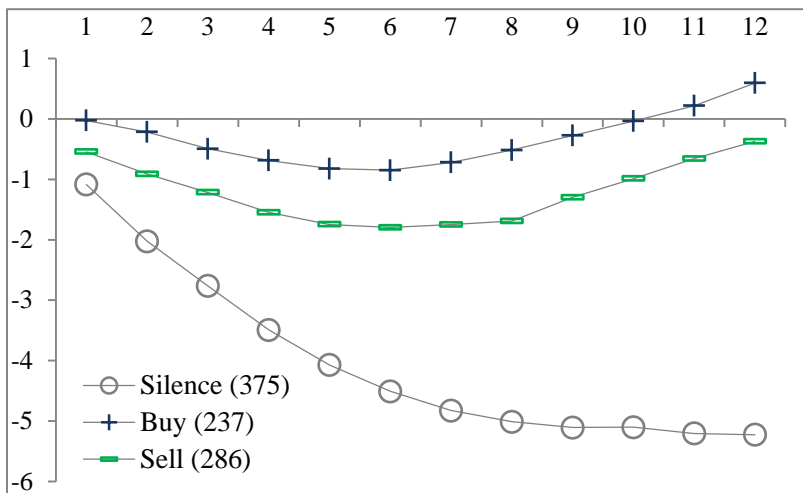
Accruals, Ac/B

Growth of Assets, dA/A

Profitability, Y/B

The sample covers NYSE/Amex/NASDAQ common stocks from January 1990 to December 2010. We sort stocks on each anomaly variable. For momentum we form five quintiles; for profitability, growth of assets, and accruals we form five quintiles for the positives and two equal groups for the negatives. The breakpoints are based on ABM firms. For firms within the short legs we further form portfolios based on their net insider demand (NID) over the past six months. NID is defined in equation (1). Firms with past positive, non-positive, and missing NID form the "buy," "sell," and "silence" portfolios, respectively. For each portfolio we present the time-series average of the equal-weight BHARs (in %) over a holding period of one to 12 months. The anomaly variables and BHAR are defined in the Appendix. Average portfolio sizes are shown in parentheses.

Appendix

The data sources are the Center for Research in security Prices (CRSP), Compustat, Thomson Reuters Insider Filing Data Feed, I/B/E/S, and Thomson 13f institutional ownership database. Following Fama and French (2008) we measure the anomaly variables by June of year t to forecast the returns in July of t to June of t+1. The exception is momentum, which is updated every month. Time t in Compustat refers to fiscal year end in calendar year t. The main variables are defined below.

Firm characteristics

MC: Market capitalization, the natural log of price times number of shares outstanding at the end of June of year t, from CRSP.

B/M: Book to market ratio, the natural log of the ratio of the book value of equity to the market value of equity. Book value B is total assets (Compustat item AT) for year t-1, minus liabilities (LT), plus balance sheet deferred taxes and investment tax credit (TXDIC) if available, minus preferred stock liquidating value (PSTKL) if available, or redemption value (PSTKRV) if available, or carrying value (PSTK). Market value M is price times share outstanding at the end of December of t-1, from CRSP.

Anomaly variables

NS: Net stock issues, the natural log of the split-adjusted shares outstanding at the fiscal year end in t-1 minus the natural log of the split-adjusted shares outstanding at the fiscal year end in t-2. The split-adjusted shares outstanding is CSHO times AJEX in Compustat.

Mom: Momentum, the buy-and-hold return from month j-12 to j-2, where j-1 is the month of portfolio formation and j is the first month of forecasted stock returns. This variable is monthly rebalanced.

Ac/B: Accruals, the change in operating working capital per share (split-adjusted) from fiscal year t-2 to t-1, divided by book equity per share (split-adjusted) in year t-1. Operating working capital is current assets (Compustat item ACT) minus cash and short-term investment (CHE) minus current liabilities (LCT) plus debt in current liabilities (DLC).

dA/A: Growth in assets, the natural log of assets per share (split-adjusted) at the fiscal year end in t-1, minus the natural log of assets per share (split-adjusted) at the fiscal year end in t-2.

Y/B: Profitability, equity income (IB), minus dividends on preferred (DVP), if available, plus income statement deferred taxes (TXDI), if available of fiscal year end in t-1, normalized by book value of equity in fiscal year t-1.

Anomaly variables (alternative definitions)

NS12: Net stock issues over the past 12 months, the natural log of the split-adjusted shares outstanding in month j-1 minus the natural log of the split-adjusted shares outstanding in month j-12, where j-1 is the month of portfolio formation and j is the first month of forecasted stock returns.

NS6: Net stock issues over the past 6 months, the natural log of the split-adjusted shares outstanding in month j-1 minus the natural log of the split-adjusted shares

outstanding in month j-6, where j-1 is the month of portfolio formation and j is the first month of forecasted stock returns.

Mom6: Momentum over the past six months, the buy-and-hold return from month j-6 to j-2, where j-1 is the month of portfolio formation and j is the first month of forecasted stock returns. This variable is monthly rebalanced.

Inv: Investment, the annual change in gross property, plant, and equipment (PPEGT of fiscal year t-1 minus PPEGT of fiscal year t-2) plus the annual change in inventories (INVT of fiscal year t-1 minus INVT of fiscal year t-2) scaled by the lagged book value of assets (AT of fiscal year t-2).

AG: Asset growth, the natural log of total assets (AT) at the fiscal year end in t-1, minus the natural log of assets (AT) at the fiscal year end in t-2.

Insider trading variable

NID: Net insider demand, NID of month j is defined as the number of shares that insiders buy minus the number of shares that insiders sell over the past six months, normalized by the total number of shares outstanding at the end of month j-1. For robustness we also vary the measuring window from one month to 12 months.

Information environment and limits to arbitrage variables

IO: Institutional ownership, the percentage owned by institutional shareholders as of the most recent quarter end.

Analysts: Number of analysts following the stock as of the most recent month end. Missing value is set to zero.

Volatility: Standard deviation of weekly stock returns over the past 52 weeks.

Return variable

BHAR: We construct buy–and–hold abnormal return (BHAR) in a way similar to the recent literature (e.g., Lakonishok and Lee 2001; Sias and Whidbee, 2010). Specifically, at the end of June of year t, we independently form NYSE size and book–to–market (B/M) quintiles to extract the breakpoint values, and assign AMEX and NASDAQ stocks to the 5 x 5 portfolios according to their size and B/M values. The equal–weight portfolio return serves as the benchmark return for the stock in the same size and B/M portfolio for the months starting from July of year t to June of year t+1. Portfolio assignment is rebalanced every year. BHAR for stock j is defined as the buy–and–hold raw return of stock j minus the buy–and–hold benchmark portfolio return. If a stock is delisted before the holding period, returns of the months after delisting are replaced with the benchmark portfolio returns. The delisting return is used for the delisting month. We calculate BHAR for all stocks/months over the holding period of one to 12 months.

Litigation risk

KS: KS is based on Model 3 in Table 7 of Kim and Skinner (2012, page 302).

$$
\begin{aligned}
KS = \ & FPS * 0.566 \\
& + LNASSETS * 0.518 \\
& + SALES\_GROWTH * 0.982 \\
& + RETURN * 0.379 \\
& + SKEWNESS * (-0.108) \\
& + STDDEV * 25.635 \\
& + TURNOVER * 0.00007/1000,
\end{aligned}
$$

where the right–hand–side variables are defined below.

FPS: equal to 1 if the firm is in the biotech (SIC codes 2833–2836 and 8731–8734), computer (3570–3577 and 7370–7374), electronics (3600–3674), or retail (5200–5961) industry, and 0 otherwise.

LNASSETS: Natural log of total assets at the end of year $t-1$;

SALES_GROWTH: Year $t-1$ sales less year $t-2$ sales scaled by beginning of year $t-1$ total assets;

RETURN: Market–adjusted 12–month stock return. The accumulation period ends with year $t-1$ fiscal year–end month;

SKEWNESS: Skewness of the firm's 12–month return for year $t-1$;

STDDEV: Standard deviation of the firm's 12–month returns for year $t-1$;

TURNOVER: Trading volume accumulated over the 12–month period ending with the fiscal year–end before year $t-1$ fiscal year–end month scaled by beginning of year $t-1$ shares outstanding.