The role of insider trading in the market reaction to news releases: Evidence from an emerging market

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Abstract:

We examine the association between reported insider transactions and news releases in India. More specifically, we test whether Indian corporate insiders trade on forthcoming earnings news, and whether the disclosure of their trades affects the reflection of earnings news in stock prices. We find little evidence that insiders trade on near-term earnings news, except in value stocks. However, insider trades do precede abnormal stock returns, suggesting that Indian insiders trade on 'fads' more than on fundamentals. Furthermore, insiders trade in an informed manner in non-conglomerates, non-government affiliated firms, and those with low foreign institutional ownership. When we focus on trades that occur in a short window prior to earnings announcements, we find some evidence that earnings news is preempted when insiders buy shares. Furthermore, those pre-announcement purchases also appear to mitigate the post-earnings announcement drift. Lastly, we find little evidence of informed trades by reporting insiders ahead of M&A announcements. Altogether, the results suggest that there is some informed insider trading by corporate insiders in India. However, despite minimal penalties, opportunistic insider trading by corporate officers is limited, and its disclosure contributes to the price formation process.

1. Introduction

By virtue of their position within the firm, corporate insiders[1] are more informed than outsiders about the future prospects of the company they work for. Absent any safeguard, this creates profitable trading opportunities for all insiders. However, the severity of agency costs related to informed trading is likely to vary with firm- and market-level governance. Numerous studies document how U.S. corporate insiders trade, and how their trades inform the market. U.S. insiders have been shown to trade both on foreknowledge about future fundamentals and potential mispricing in their stock (e.g., Seyhun 1992, Piotroski and Roulstone 2005). They have also been shown to refrain from trading shortly ahead of sensitive news announcements. We seek to examine whether Indian insiders—who face lower penalties associated with informed trading—trade more conspicuously on near-term fundamental news. Additionally, we examine whether the disclosure of their trades affects the incorporation of firm fundamentals in stock prices.

Prior research provides a stark contrast between two neighboring countries in terms of insider trading and stock price efficiency. Starting with Ball and Brown (1968), extensive research on U.S. capital markets documents that earnings announcements elicit significant market reactions. Research also shows that U.S. insiders refrain from trading shortly ahead of those earnings announcements, a pattern attributed to litigation risk (Huddart et al. 2007). In contrast, Bhattacharya et al. (2000) find no reaction to major news announcements in Mexico. They infer from price patterns prior to the announcements that unregulated (and undisclosed) insider trading fully preempts the announcements' information content. Our goal is to examine insider trading behavior vis-à-vis earnings news in an environment where capital market institutions are neither as advanced as those in the U.S. nor as barebones as those in Mexico in the 1990s.

Nowadays, many countries and stock exchanges require timely public disclosure of equity transactions by corporate insiders in their own firm's stock. This requirement is believed to promote more transparent capital markets, where outsiders can be promptly notified when corporate insiders engage in transactions that may be based on their superior private information about future news. Furthermore, the

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[1] Throughout the paper, we use the term "(corporate) insider" to indicate individual executives and officers who are subject to reporting requirement according to Securities Exchange Board of India regulations.

disclosure requirement themselves are considered as a tool to deter insiders from engaging in opportunistic trading. However, among the countries that require those disclosures, significant differences remain in terms of capital market development, governance, and enforcement mechanisms. Hence, it is not clear, ex ante, whether those disclosures can enhance capital market integrity and transparency in the absence of strong institutions. In fact, Firdmuc et al. (2013) find that the information content of insider trade disclosures varies with the degree of investor protection against insider self-dealing. However, little is known on what information insiders trade upon in jurisdictions with relatively weak investor protection, and what effect their reported trades have on the informativeness of other disclosures.

Our first hypothesis examines whether Indian corporate insiders' trades are associated with future returns and earnings news. Prior research shows that U.S. insiders' net purchasing activity is associated with both future abnormal returns and future earnings realizations (e.g., Piotroski and Roulstone 2005). However, insiders also refrain from trading too close to earnings news, especially when negative, a pattern attributed to litigation risk (e.g., Huddart et al. 2003). We are not aware of similar research in major emerging markets. On the one hand, lax enforcement may enable insiders to trade more aggressively on foreknowledge of undisclosed material news such as earnings. On the other hand, both insider trades and earnings are likely to be noisier signals in environments where insiders trade less often and can extract rents through other channels. Hence, the association between insider trades and future earnings is an empirical question.

We further explore whether the proclivity of Indian insiders to trade on their private information varies depending on the individuals' position in the firm and the ownership structure. Indian corporations greatly differ from U.S. ones in terms of ownership concentration, which likely has significant implications for the nature, frequency, and motivation behind insider trades. On the one hand, greater ownership concentration exacerbates information asymmetry between insiders and outsiders. On the other hand, ownership concentration possibly lowers insiders' incentives to trade (especially sell), and likely affords more lucrative and less visible ways to extract rents.

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We use four partitioning criteria based on the firm shareholding structure to examine variation in insider trading profitability. The first two are based on the business structure. We first compare conglomerates to non-conglomerates. We expect insiders from conglomerates to have a greater information advantage, due to the underlying complexity of the firm. Second, we compare firms that are government affiliated to the rest. We expect insiders from government-affiliated firms to be subject to greater scrutiny with regards to their insider trading activities. The other two partitioning criteria are based on the ownership structure. We first distinguish firms based on the percentage of ownership by promoters, to investigate whether promoters' ability and incentives to trade in an informed manner is exacerbated when they effectively control the firm. Second, we distinguish firms based on the percentage of foreign ownership. Firms with greater foreign ownership may strive to abide by global practices in terms of transparency, and refrain from trading conspicuously on material private information.

The results indicate that insiders trade more profitably in non-government-affiliated companies, and those with relatively low foreign ownership. There is also some evidence that they trade more profitably in non-conglomerates. In contrast, promoter ownership bears no association with the degree of informed trading. Collectively, these results offer a mixed picture. They suggest that insider trading profitability varies with some dimensions of firm-level ownership structure that proxy for information asymmetry.

Our second hypothesis examines (a) whether Indian insiders trade shortly ahead of earnings news and (b) whether their trades during that sensitive period preempt the price impact of earnings announcements. If India is like the U.S., there should be little to no trading in the period preceding earnings announcements, and the earnings announcements should elicit significant stock price changes largely driven by the underlying earnings innovation. Although there is no explicit regulatory requirement, many U.S. firms voluntarily adopt blackout windows on insider trades before earnings news (Bettis et al. 2000). Furthermore, to avoid violating Regulation Fair Disclosure, U.S. firms also often set up quiet periods where they further limit their interactions with the investment community. At the other end of the spectrum, if India is more like Mexico as in Bhattacharya et al. (2000)—except with corporate insider trades being publicly revealed—then significant trading activity will be observed ahead of earnings announcements,

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which will elicit little market reaction. There are several reasons why we may fail to reject the null. Chief among those is the fact that disclosed insider transactions may only be the tip of the iceberg as far as insider trading is concerned in India. Indeed, if disclosure requirements are not enforced, then the same insiders may trade more aggressively through unreported channels. Alternatively, corporate insiders subject to reporting requirement may report truthfully and/or refrain from trading on material news, but others insiders or those receiving tips may be the ones engaging in insider trading "under the radar". Hence, the degree to which disclosed insider trades preempt earnings news is also an empirical question.

We draw our empirical tests from a combination of datasets. We obtain insider trade information and stock data from Prowess, and accounting data from Compustat Global. Additionally, we retrieve analyst forecasts from I/B/E/S and corporate guidance from Capital IQ. Our sample consists of 24,135 firm-year observations from 2006 to 2014. We start in 2006 because insider trading data is not available prior to that year. We examine all reported open market purchases and sales. We find that insiders report a transaction in only about a fourth of the firm-years in the sample. In firm years when insiders do report transactions, they buy about 8 times a year compared to approximately four sale transactions. However, the extent of sales is significantly higher at about 1.5 million shares sold per trade compared to around 940 thousand bought per trade.

With respect to the first hypothesis, we find little evidence of insiders trading on future earnings news, except for value stocks (i.e., high book-to-market stocks). There is, however, a positive and significant relation between net insider purchases and future stock returns. Hence, Indian insiders appear to trade on private information, but not about near-term fundamentals. This suggests, instead, that they trade on 'fads', i.e., deviations from fundamentals (Seyhun 1992).

With respect to the second hypothesis, we find some evidence of insiders trading ahead of earnings announcements, albeit not in large amounts. Seven percent of earnings announcements are preceded by at least one insider transaction timed after the end of the fiscal year. The amount of trading in the month preceding earnings announcements is lower than in other months, although the difference is economically small, and less pronounced than in the U.S. In terms of earnings announcements' information content, the

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baseline result indicates that three-day cumulative market-adjusted returns (CAR) around earnings announcements are positively and significantly associated with standardized earnings surprises (SUE), measured as the difference between realized and lagged annual earnings per share (EPS), scaled by the standard deviation of this earnings difference over the previous three to five years. The coefficient on SUE in this regression is commonly referred to as earnings response coefficient (ERC). When insiders trade ahead of earnings announcements, however, there is a lower ERC. Further analysis indicates that this is driven by earnings announcements preceded by insider net buying. In addition, earnings announcement CARs are significantly higher when insiders are net buyers, holding the earnings surprise constant. This suggests that when insiders buy shares ahead of earnings news, their trades signal good news and preempt the information content of the earnings signal.

Additionally, we look at short-window returns around the disclosure of insider trades that occur ahead of earnings announcements. This enables us to examine if the market infers earnings news around those disclosures. We find that the five-day CARs around insider purchase disclosures are positively and significantly associated with the upcoming earnings surprise. This suggests that timely disclosures of insider purchases convey a signal about forthcoming earnings news. In contrast, sales disclosures are not associated with upcoming earnings.

To complete the picture from the results obtained thus far, we analyze returns in the weeks following the earnings announcement. One of the most robust market anomalies documented in the U.S. is the so-called post-earnings announcement drift (PEAD). Bernard and Thomas (1989) show that the drift in returns following earnings announcement is indeed a delayed price response to the latest earnings news. Although the PEAD is not observed in all countries (see Hung et al. 2015 for global evidence), we test whether pre-earnings announcement insider purchases preempt not only the ERC, but also the PEAD. We replicate our analysis above by replacing the three-day CAR around earnings announcement with the 30-day CAR starting two days after the earnings announcement. The results suggest that, on average, post-announcement returns are positively associated with earnings surprises, consistent with the PEAD. However, there is no drift for earnings announcements preceded by insider purchases.

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Throughout the main tests, we assume that the market's expectation for end-of-the-year earnings is earnings as of the end of the prior year. While this is a common assumption in the absence of a better surrogate for expected earnings, some firms are covered by analysts who issue EPS forecasts, which are likely more timely and accurate than a simple random walk model. When we re-run our analyses using analyst-based expectations, not surprisingly, we find a positive and significant ERC. However, our results with respect to insider trading weaken. That is, we find no statistically robust evidence that insider purchases and disclosure thereof preempt the unexpected component of earnings using analyst forecasts. This suggests that for firms with a better information environment, the ability of insiders to trade shortly ahead of earnings and the information content of those trades is limited.[2]

We use earnings news as our primary setting for two reasons: (a) earnings releases are generally a major information event, and they provide a non-return based measure of news (that is, the earnings surprise); and (b) all firms are expected to release earnings information at least once a year, which mitigates concerns of selection bias inherent to other events such as equity offerings, analyst forecasts, etc. However, our interest in corporate insiders' information advantage goes beyond earnings. To complement our analyses, we examine insider trading and stock returns around M&A announcements. Using all M&A transactions recorded in the Prowess database, we find that targets' price run-ups are significantly higher when insiders report buying shares in the month preceding an M&A announcement. However, pre-announcement insider trades are relatively infrequent, which indicates that Indian corporate insiders do not engage in egregious insider trading – or, if they do, it goes unreported.

We contribute to the literature in the following ways. First, to our knowledge, this is the first paper to examine the association between insider trading and future earnings in an emerging market. In fact, while that association has been examined extensively in the U.S., we are not aware of any paper looking at the predictive content of insider trades for future fundamentals in other countries. The tenor of our results offers

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[2] We perform a variety of robustness checks to further validate our conclusions. In particular, we limit the sample to firms with at least one reported trade during the sample period. We do so to alleviate concerns of fundamental differences between firms whose insiders trade and others, in terms of information environment and earnings patterns. Our main results hold in that sample.

some contrast with the U.S. evidence. While U.S. insiders trade on foreknowledge of future earnings realizations (Piotroski and Roulstone 2005), they refrain from doing so shortly ahead of news releases (Huddart et al. 2007), especially negative ones (Huddart et al. 2003). This is especially true after the passage of the Insider Trading and Securities Fraud Enforcement Act (ITSFEA) of 1984 (Garfinkel 1997). Indian insiders, on the contrary, do not trade on near-term earnings, except in value stocks. However, when they buy shares shortly before earnings releases, their trades are informative about the earnings news. Collectively, the results suggest that reported insider trades in India have little predictive content for future fundamentals, except during windows that are deemed too sensitive for U.S. insiders to be allowed to trade.

Our second contribution is to the literature on the association between insider trades and the information content of earnings announcements. Prior evidence using U.S. data suggests that in a less strict enforcement regime (i.e., pre-ITSFEA), insiders trade more conspicuously on forthcoming earnings news, which reduces the information content of earnings announcement (Udpa 1996; Garfinkel 1997). We provide novel evidence on insiders' trading behavior in the run-up to earnings announcement in an emerging market, where capital market institutions may not be on par with those of present-day U.S. markets, but where information dissemination is poised to be more efficient than in the 1980s as examined by the aforementioned studies.

Lastly, abstracting from insider trades, we contribute to the literature on the information content of earnings announcements. There again, prior research has extensively examined the phenomenon in the U.S., where earnings announcements elicit significant market reactions. In contrast, Bhattacharya et al. (2000) find no reaction to earnings and M&A news in Mexico. In a cross-country setting, DeFond et al. (2007) document a positive association between the information content of earnings announcements and investor protection, measured among others by the quality and enforcement of insider trading laws. India is considered to have weak investor protection in DeFond et al. (2007) and other cross-country studies on capital market institutions. However, we find that earnings announcements are, on average, informative for Indian firms. Furthermore, we document how disclosed insider trades contribute to the price formation process prior to earnings announcements. Our more granular evidence suggests that on the U.S-Mexico

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spectrum, India is closer to the U.S., consistent with Indian capital market institutions converging towards global best practices.

We offer some caveats with the interpretation of our results. First, while it is straightforward to assume that corporate insiders do have superior knowledge of future fundamentals, it is difficult to tell whether their trades are motivated by that foreknowledge, and if it is, over what horizon it should be measured. Second, disclosed insider trades may only be the tip of the iceberg as far as informed insider trading is concerned. Accordingly, the inferences we draw should not extend to the broader concept of (illegal) insider trading that market participants and regulators are most concerned with. Third, inferences drawn from disclosed insider trades, earnings news and stock returns are subject to correlated omitted variables and endogeneity concerns that our analyses do not fully rule out.

The remainder of the paper is organized as follows. Section 2 reviews the institutional setting and literature. Section 3 describes the research design and sample. Section 4 reports the results. Section 5 reports additional tests using the M&A setting. Section 6 concludes.

2. Institutional Background and Literature

2.1. Institutional background

In this section, we offer a very brief primer on the disclosure requirements for insider transactions and earnings announcements in India.

The disclosure of insider trading has been required since 1992 by the Securities and Exchange Board of India ([Prohibition of] Insider Trading) Regulations, 1992. The SEBI revised the regulatory framework in 2015 to address some perceived inadequacies with the 1992 Regulations. The key changes related to disclosure requirements are that (1) the 1992 Regulations require disclosures by, in addition to directors and officers, any person holding more than 5% shares or voting rights, whereas the 2015 Regulations replaced the 5% shares rules with "connected persons," which is defined in detail in chapter 1, and (2) the 2015 Regulations also require disclosures of trading in derivatives.

Insider trading enforcement while not absent, is significantly weaker in India, than in the US. In terms of legal implications, Insider trading is prosecuted as a civil crime as opposed to criminal penalties in the US. The maximum penalty imposed so far in India has been Rupees 3 Million which is around USD 50,000 - most penalties (numbering about 30 over the last ten years) are significantly smaller. In the absence of criminal penalties and the modest financial penalties, it is unclear if insider trading is fully disclosed or if the disclosure is merely the tip of the proverbial iceberg.

Under the current disclosure requirements, promoters, employees, and directors are required to report to the company the number of securities acquired or disposed of within two trading days of such transaction if the value of the securities traded over a calendar quarter aggregates to a traded value in excess of one million rupees. The company then must notify the particulars of such activities to the stock exchange within two trading days of the receipt of the disclosure.

Financial results should be submitted to the stock exchange within 45 days of end of each quarter. The annual audited standalone financial results for the financial year should be submitted within 60 days from the end of the financial year. If the listed entity has subsidiaries, the annual audited consolidated financial results must also be submitted. The annual report should be submitted to the stock exchange within 21 working days of it being approved and adopted in the annual general meeting. The top 500 listed entities based on market capitalization should include business responsibility report as well as dividend distribution policy in the annual report, whereas the entities other than top 500 are not required to do so.

2.2. Literature review

A large literature documents that corporate insider trades precede significant abnormal returns in the U.S. (e.g., Smith 1940; Lorie and Niederhoffer 1968; Seyhun 1986; Lakonishok and Lee 2001), and other countries (e.g., Fidrmuc et al., 2006, for the U.K.; Betzer and Theissen 2009 for Germany). While this evidence is mostly based on windows spanning several months after the insider trade occurs, two streams of literature have examined more specifically whether (a) the market reacts to the disclosure of insider trades and (b) insiders trade on superior knowledge of future cash flow realizations. A corollary of

these two questions is (c) whether the market reaction to insider trade disclosures is correlated with the cash flow information that insiders trade upon.

With respect to (a), the answer depends in part on the disclosure regime and the institutional environment. While Lakonishok and Lee (2001) find no significant returns around insider trade disclosures prior to Sarbanes-Oxley (SOX), Brochet (2010) shows that after SOX, short-window returns and trading volumes around Form 4 filings increased significantly, especially for insider purchases. Brochet (2010) attributes the results to the significant reduction in the mandatory filing delay of U.S. insider trades (from one month to two days). This also corroborates evidence from the U.K., where timely disclosure had been imposed even before SOX (Fidrmuc et al. 2006).

Many countries—including India—require timely disclosure of insider trades, but this need not mean that insider trade disclosures will elicit significant reactions in all jurisdictions. Using a sample of European countries and the U.S., Fidrmuc et al. (2014) find that the market reacts more (less) strongly to insider purchases (sales) in countries with stronger investor protection, like the U.S. or the U.K. Their interpretation of the results is that, in countries with high investor protection, market participants find insider purchases as more credible and reliable signals of good news, whereas insiders refrain from selling ahead of bad news in those countries.

With respect to (b), the literature has primarily focused on the association between insider trades and future realizations of operating performance metrics such as return on assets (ROA) or earnings-per-share to gauge whether insiders trade on foreknowledge of those fundamentals. The literature, exclusively based on the U.S. as far as we can tell, offers a few insights. First, insiders trade on foreknowledge of future earnings, as evidenced by the association between net insider purchases and future change in ROA (Piotroski and Roulstone 2005, 2008). Piotroski and Roulstone examine data on the firm-year level. Looking at monthly data, Garfinkel (1997) finds a significant decrease in informed insider selling immediately prior to earnings announcements around the passage of the ITSFEA. This is in part due to firms' voluntary adoption of blackout policies on insider trading ahead of earnings announcements (Bettis

et al. 2000).[3] More recent data echoes this pattern. Huddart et al. (2007) find that insiders avoid trading before earnings announcement, and instead trade 'passively' after the news (i.e., sell [buy] after good [bad] news). Huddart et al. (2003) further show that insiders reduce their stock sales two quarters ahead of a break in a string of earnings increases. The overarching explanation for these results is that litigation risk disciplines opportunistic insider trading.

At the intersection of (a) and (b) lie two sets of analyses. First, does the information content of earnings announcement vary with the degree of insider trading? Upda (1996) finds lower ERCs during announcements preceded by insider trades in a sample of 96 firms between 1981 and 1984 (i.e., before ITSFEA). Second, do insider trade disclosures convey information about future earnings news? Veenman (2012) documents a positive association between five-day CARs around insider purchase filings and the change in ROA measured over the next four quarters. Hence, there is some evidence of insider trades preempting and signaling earnings news.

Why should any of the above differ in India compared to the U.S.? On the one hand, the expected penalties of trading on foreknowledge of earnings news should be lower for Indian insiders. While there is insider trading enforcement in India, it is significantly weaker than in the U.S. We infer this from the fact that insider trading is prosecuted as a civil as opposed to criminal offense, and from the modest penalties imposed thus far (a maximum of Rupees 3 million [~$50,000]). Furthermore, while U.S. insiders can be disciplined via private litigation, no such mechanism exists in Indian capital markets. This would lead to predict more aggressive trading by Indian insiders on undisclosed earnings news.

On the other hand, the expected benefits may be lower too. Indeed, the ownership structure of Indian corporations differs greatly from that of U.S. firms (Khanna and Palepu 2005). Greater ownership concentration in the hands of family groups alters insiders' incentives in such a way that insider trading may be of little importance to them. That is, Indian insiders' utility and compensation is likely less sensitive

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[3] Several countries impose such blackout policies, although the U.S. is not one of them. In the U.K., there is an explicit ban on trading by corporate insiders in the run-up to earnings announcements. Korczak et al. (2010) find that insiders trade strategically around other significant news announcements.

to their ability to maximize their own insider trading gains through the joint timing of trades and news releases. Whether it is for rent-extraction or signaling, Indian insiders are thus less likely to resort to disclosed insider trades to enhance their compensation and/or maximize stock price.

The degree to which the regulatory environment (both in terms of rules and enforcement) and the ownership structure contribute to insiders' incentives to trade on earnings news will also affect the information content of the disclosure of both insider transactions and earnings. In the absence of enforcement and disclosure of insider trades, Bhattacharya et al. (2000) find that earnings releases (and other major news events) trigger no market response in Mexico in the 1990s. They attribute the result to insider trading because the news is fully anticipated by the market. In a cross-country setting, DeFond et al. (2007) find that the market responds more strongly to earnings announcements in countries with stronger investor protection, including through better insider trading regulation and enforcement. Insofar as India falls short of the U.S. in terms of minority investor protection, insider trade and earnings disclosures in India may trigger lower market responses.

Overall, given that capital market informational efficiency is endogenously determined with the institutional environment (including but not limited to insider trading regulation and ownership diffusion), the trading behavior of Indian corporate insiders and informativeness thereof is an empirical question.

3. **Research design**

3.1. Insider Trading and Future Performance

We design our first set of tests to examine whether corporate insiders trade on future earnings and stock returns. We follow Piotroski and Roulstone (2005) closely, with a few minor adjustments to better accommodate Indian data, by running the following model:

$$NPR_{i,t} = \beta_1 * Ret_{i,t} + \beta_2 * Ret_{i,t+1} + \beta_3 * \Delta ROA_{i,t} + \beta_4 * \Delta ROA_{i,t+1}$$

$$+ \beta_5 * Book\text{-}to\text{-}Market_{i,t} + \beta_6 * Firm\ Size_{i,t} + \Sigma \alpha_j * Year\ FE \qquad (1)$$

Subscripts i and t indicate firms and fiscal years, respectively. The dependent variable *NPR* is the net purchase ratio, defined as the difference between the number of shares bought and the number of shares

sold by insiders, scaled by the total number of shares traded. To include firm-years with no reported insider trading, we also set NPR to zero when no trade takes place during the year. *Ret* is the market-adjusted return over the fiscal year. *ΔROA* is income before extraordinary items (IB in Compustat Global) at the end of the fiscal year minus that of the previous fiscal year, scaled by average total assets. Our coefficients of interest are β_2 and β_4, both of which should be positive if insiders tend to buy relatively more shares ahead of positive stock returns and changes in ROA in the year following their trades. We also control for expected determinants of NPR. *Book-to-Market* is the ratio of the firm's book value of common equity to its market capitalization as of the beginning of the year. If Indian insiders behave like U.S. insiders, they should buy (sell) relatively more shares in value (growth) stocks, i.e., when the book-to-market ratio is higher (lower). We also control for *Firm Size* as the natural logarithm of the firm's market capitalization. Again strictly based on patterns observed in the U.S., we expect a negative, as insiders from larger firms are more likely to engage in insider selling due to greater stock-based compensation and liquidity needs. We also include year fixed effects to control for macro time-series patterns in insiders' net purchasing. Thus, there is no single intercept in the regression. Rather, the intercept differs across years.

3.2. Earnings Response Coefficients

$$CAR_{i,t} = \beta_1*SUE_{i,t} + \beta_2*IT_{i,t} + \beta_3*SUE_{i,t}* IT_{i,t}$$
$$+ \beta_4*Forecast_{i,t} + \beta_5*PreAnn_{i,t} + \beta_6*Bundle_{i,t}$$
$$+ \beta_7*Book\text{-}to\text{-}Market_{i,t} + \beta_8*Firm\ Size_{i,t} + \beta_9*Loss_{i,t}$$
$$+ \Sigma\alpha_j*Year\ FE \tag{2}$$

Subscripts i and t indicate firms and fiscal years, respectively. *CAR* is the five-day cumulative market-adjusted return centered on the earnings broadcast date. *SUE* is the difference between reported earnings per share (EPS) and one-year-lagged EPS, scaled by the standard deviation of past differences in EPS over three to five years depending on data availability. This definition of *SUE* is consistent with prior research that examines earnings surprises for as large a group of firms as possible (i.e., without requiring analyst coverage). It assumes a random walk model for earnings, so that the expectations for current year's earnings are last year's earnings. To reduce noise in *SUE*, we replace it with its decile ranking based on

annual distributions.[4] If earnings announcements have information content, we should observe a positive β_1 (a.k.a. the ERC). *IT* is an indicator variable equal to one if there is any open-market insider purchase or sale reported between the end of the fiscal year (DATADATE in Compustat Global) and the earnings broadcast date. Our main variable of interest is the interaction between SUE and IT. If disclosed insider trades preempt (some of) the earnings news, then we should observe a negative β_4.

We include several control variables that are expected to impact the market reaction to earnings announcements. *Forecast* is a categorical variable equal to 1 (-1) if the number of positive (negative) analyst EPS forecast revisions issued between the end of the fiscal year and the earnings broadcast date exceeds the number of negative (positive) forecast revisions, zero otherwise. If analysts cover the firm and revise their forecasts after the end of the fiscal year, their forecast revisions may be more explicit and informative signals about upcoming earnings than insider trades. *PreAnn* (*Bundle*) indicates earnings announcements that are preceded by (coincide with) the issuance of a forecast for the next year's earnings or another performance metric, as per Capital IQ Key Developments. Those explicit disclosures about future earnings may also influence the market reaction to realized earnings. *Loss* indicates firm-years for which reported earnings are negative. Market reactions are likely lower for those firms, irrespective of SUE. Lastly, *Book-to-Market* and *Firm Size* control for potential risk factors.

In an alternative specification, we replace *IT* with two indicators for whether insiders are net buyers (*BUY*) or net sellers (*SELL*) ahead of the earnings announcement. This allows us not only to separately test the effects of insider buying and selling on the ERC, but also to examine the coefficients on *BUY* and *SELL*, respectively. Informed insider buying (selling) could lead to a positive coefficient on *BUY*, and a negative coefficient on *SELL*.

3.3. Market Response to Insider Trade Disclosures

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[4] We obtain largely consistent results with continuous SUE, provided we winsorize it at 5% each tail (untabulated). One potential concern with decile rankings by year is that macro variation in earnings surprises across years may lead to inconsistencies in yearly distributions (e.g., the average SUE for a given decile may be positive or negative in some years). We note that the median SUE is always positive in deciles 7 to 10, whereas it is always negative in deciles 1 to 3. Hence, our partitions in terms of good and bad news are adequate. The 'neutral' news partition is noisier, as it mixes positive and negative earnings SUE.

Lastly, we examine whether the disclosure of insider transaction signals future earnings using the following model:

$$CAR\_BUY(SELL)_{i,j,t} = \beta_1 * SUE_{i,t} + \beta_2 * Trade\ Size_{i,j,t}$$

$$+ \beta_3 * Book\text{-to-}Market_{i,t} + \beta_4 * Firm\ Size_{i,t} + \Sigma\alpha_j * Year\ FE \qquad (3)$$

Subscripts i, j and t indicate firms, traders, and fiscal years, respectively. The unit of observation is the disclosure date of an open-market insider purchase or sale between the fiscal year end and the earnings broadcast date. The model is run separately for purchase and sale disclosures. *CAR_BUY* (*CAR_SELL*) is the five-day cumulative abnormal return starting from the day an insider purchase (sale) is reported through SEBI. If several trades are reported on the same date, we consider them as a single event. Our coefficient of interest is β_1: If market participants infer forthcoming earnings news around the disclosure of an insider transaction, the coefficient on SUE should be positive. *Trade Size* is the number of shares reported as bought or sold, scaled by shares outstanding. If larger trades elicit stronger reactions, β_2 should be positive for purchases and negative for sales. *Book-to-market* and *Firm Size* are as previously defined.

4. Empirical Results

4.1. Sample and Descriptive Statistics

Our main source of data is Prowessdx, from which we collect data on insider trades, identities of individual insiders, and stock returns data. Annual accounting data are from COMPUSTAT Global database[5] and analyst forecast data from I/B/E/S. We also collect earnings announcement date as well as data on the date when insider trades are reported publicly from the Bombay Stock Exchange (BSE) and National Stock Exchange of India (NSE) websites. We obtain data on guidance issuance from Capital IQ.

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[5] We do not use Prowess for financial statement data because we have found many discrepancies in the scope of the reporting entities. That is, the Prowess database includes observations that are not consolidated at the group-level. The downside of Compustat Global is that it is limited to relatively larger firms, which potentially weakens the power of our tests. However, we find a match for 88% of the 2,710 unique firms in Prowess with at least one insider trade between 2006 and 2014. This suggests that most of the firms reporting insider trades are among the larger ones included in Compustat Global.

We first provide general descriptive statistics on insider trading reporting in India in Table 1, Panel A. Of the 2,904 firms for which we have accounting and stock price data, 2,302 report at least one insider trade. The annual distribution reveals that sample size increases from 395 firms with reporting insiders in 2006 to 1,215 such firms in 2010, at which point the number of firms stabilizes until 2013 included. The number of insiders per firm that report at least one trade follows a similar pattern. It increases from 3.02 in 2006 to 4.44 in 2010, at which point it remains stable between 4.4 and 4.7. Conditioned upon an insider trading in a given firm-year, the average number of trades reported by the insider starts at 1.61 in 2006 and increases to 3.04 in 2009, which is close to the sample average of 3.07. Hence, to summarize Panel A of Table 1, for firms with at least one insider trade, there are four insiders who trade during a typical year, and each reports an average of three trades. Figure 1 further indicates that, on average, 2.6 insiders report one trade per year, and 0.65 insider reports two trades, etc.

Table 1, Panel B reports statistics for the variables used in Model (1). Hence, the unit of observation is a firm-year. Conditioned upon at least one trade taking place (which occurs in 5,623/19,403=29% of the sample) the mean net purchase ratio is 0.32, whereas the median is 1. That is, insiders tend to buy more shares than they sell. This is quite different from the U.S. where insider sales largely outnumber purchases, but otherwise to be expected in most other countries, where equity-based compensation is not nearly as prevalent as in the U.S. Hence, the notion of purchases being relatively unusual and sales being largely driven by portfolio rebalancing and liquidity may not hold in India.

Panel C reports statistics for the variables used in Model (2). Based on the mean *IT*, 8.5% of earnings announcements are preceded by at least one reported insider trade. We will later compare IT in that window to others that are deemed less sensitive in terms of information asymmetry. Consistent with the firm-year data from Panel B, observations where insiders are net buyers (5.8%) outnumber those where they are net sellers (2.6%) ahead of earnings announcements. Unlike the U.S., the practice of earnings guidance is quite rare, with less than one percent of observations having a pre-announcement or a forecast bundled with the earnings announcement. Based on the mean *Loss*, 18% of reported earnings are negative.

Panel D reports statistics for the analysis of insider trade disclosures, separately for purchases and sales. Data on reporting dates is missing for some transactions, so not all trades included in Panel C end up in Panel D. The median five-day CAR around insider trade disclosure is positive at 0.59% for purchases, and negative at -0.41% for sales, respectively. This suggests that insider trades preceding earnings announcements are informative. Interestingly, the mean and median *SUE* decile is higher for sales than for purchases, inconsistent with insiders buying and selling ahead of good and bad news, respectively. Mean and median book-to-market ratio is higher for purchases than for sales, consistent with insiders being more likely to buy value stocks and sell growth ones. Firm size is also higher at the mean and median for sales, consistent with insiders from larger firms being more likely to have stock-(option) based compensation.

4.2. Insider Trading, Future Earnings and Returns

We test our first conjecture that Indian insiders trade on foreknowledge of future earnings news and returns by running an OLS estimate of Model (1). We cluster standard errors by firm, and include (but do not tabulate) year fixed effects. Table 2 reports the results. In Panel A, the first column includes only firm-years for which there is at least one trade. The coefficients on both Ret_t and Ret_{t+1} are positive and significant. This indicates that insiders buy more than shares than they sell during and ahead of years with greater market-adjusted returns. In terms of economic magnitude, a one-standard-deviation increase in current (future) return is associated with a higher net purchase ratio by approximately 4.8% (4.5%). However, the coefficients on ΔROA_t and ΔROA_{t+1} are not significant. Hence, conditioned on at least one insider trading, the collective trading by insiders at the firm-year level as measured by the net purchase ratio does not indicate that they trade on foreknowledge of earnings changes over the current and next year. Control variables are significant in the expected direction: Insiders tend to buy more shares in value stocks (as per the significantly positive coefficient on book-to-market ratio) and sell more in larger firms (as per the significantly negative coefficient on log of market capitalization).

The second column in Panel A reports the results for the full sample. The net purchase ratio is set to zero if there is no insider transaction. The coefficients on both Ret_t and Ret_{t+1} remain positive and significant. Hence, when insiders decide not to trade, it is also informative about future returns. The

coefficients on ΔROA_t and ΔROA_{t+1} become negatively significant. If anything, this suggests that insiders buy more shares ahead of lower earnings changes. This is inconsistent with foreknowledge of earnings news driving insider trades. Instead, insiders may be trading on fundamentals that will materialize later than what our tests capture. Of note, the coefficient on firm size is positive and significant in the full sample. This likely reflects the fact there is less insider trading in smaller firms.

To further investigate which firm characteristics are associated with informed insider trading, we partition the sample by size and book-to-market. For each fiscal year, we assign firms to a book-to-market ratio and a market capitalization tercile. Prior research shows that insiders earn greater returns in smaller firms, and buy (sell) more shares in high (low) book-to-market firms (Lakonishok and Lee 2001).

Table 2, Panel B reports the results by market capitalization partition. Column 1 reports results for the low tercile (small caps), column 2 the middle tercile (mid caps), and column 3 the high tercile (large caps). In column 1, i.e., small caps, we find results consistent with the full sample. That is, net insider purchases are associated with significantly higher market-adjusted returns in the same and following year. The coefficients on ΔROA_t and ΔROA_{t+1} are both positive but not significant. In column 2, the coefficients on Ret_t and Ret_{t+1} are positive and significant, just as in the full sample and the bottom tercile. That is, in mid caps, insiders buy more shares ahead of positive abnormal returns. Furthermore, their net purchases are positively associated with current-year earnings, as suggested by the positive coefficient on ΔROA_t, which is marginally significant (p=0.10). The coefficient on ΔROA_{t+1} is negative and insignificant. In column 3, the coefficients on Ret_t and Ret_{t+1} are positive, but not significant. Hence, the positive association between insider net purchases and subsequent stock returns is not driven by large caps. Furthermore, the coefficients on ΔROA_t and ΔROA_{t+1} are both negative, and the one on ΔROA_t significant (p=0.02). Hence, in large caps, insiders buy more shares in years where they report lower earnings growth.

Table 2, Panel C reports the results by book-to-market partition. Column 1 reports results for the low tercile (growth stocks), column 2 the middle tercile, and column 3 the high tercile (value stocks). In column 1, the coefficients on Ret_t and Ret_{t+1} are positive, but marginally significant for the first (p=0.07) and insignificant for the second. Hence, the positive association between insider net purchases and

subsequent stock returns is not driven by growth stocks. Furthermore, the coefficients on ΔROA_t and ΔROA_{t+1} are both negative and significant. Hence, in growth stocks, insiders buy more shares ahead of lower earnings growth. This is inconsistent with their trading on foreknowledge of future earnings. In column 2, i.e., neither high nor low book-to-market, we find results consistent with the full sample. That is, net insider purchases are associated with significantly higher market-adjusted returns in the same and following year. The coefficients on ΔROA_t and ΔROA_{t+1} are both negative but not significant. In column 3, the coefficients on Ret_t and Ret_{t+1} are positive and significant, just as in the full sample and the middle tercile. That is, in value stocks, insiders buy more shares ahead of positive abnormal returns. Furthermore, their net purchases are positively associated with near-term earnings, as suggested by the positive coefficients on ΔROA_t and ΔROA_{t+1}. The coefficient on ΔROA_t is significant (p<0.01), whereas the one on ΔROA_{t+1} is only marginally so (p=0.11). Nevertheless, this indicates that in value stocks, insiders trade in a way that signals upcoming earnings increases.

Altogether, the results in Table 2 indicate that insider net purchases aggregated at the firm-year level are positively associated with current- and subsequent-year market-adjusted returns. There is no association between net insider purchases and forthcoming earnings growth in the full sample, suggesting that, to some degree, Indian insiders trade on 'fads' rather than fundamentals, to use the dichotomy coined by Seyhun (1992). There is, however, some evidence that in mid-caps and value stocks, insiders buy relatively more shares ahead of earnings increases.

4.3. Sample Partitions Based on Business and Ownership Structure

We next examine whether Indian insiders trade more profitably depending on the ownership structure of the firm. As the main results from Table 2 indicate that net insider purchases precede abnormal stock returns but not accounting performance, we focus our discussion on the return-based evidence.

Table 3 reports the results. In Panels A and B, the sample is split between firms that are classified as conglomerates or not (Panel A), and those that are government-affiliated or not (Panel B), as per Prowess. In Panel A, the results indicate that net insider purchases are more robustly associated with future returns among non-conglomerate entities (the difference is more striking when we restrict the sample to firm-years

with at least one trade – not tabulated). In Panel B, the results indicate that insiders trade more profitably in non-government affiliated companies. In fact, insiders in government-affiliated firms tend to buy relatively more shares ahead of *lower* stock returns, which suggests that their trades are not driven by private information. This result is consistent with greater political and reputation costs associated with insider trading in firms more closely involved with the government or states.

In Panels C and D, the sample is split based on the percentage of ownership by promoters (Panel C) and foreign institutions (Panel D), which we obtain from Prowess. In Panel C, the results indicate that net insider purchases are positively associated with current and future stock returns across all partitions. While the coefficient on future returns is not significant in the middle tercile, the magnitude is relatively close to that in the top and bottom terciles. Hence, there appears to be no noticeable difference in the degree to which insiders trade on private information across firms as a function of promoters' ownership. In Panel D, the coefficient on future returns is positive and significant only in the bottom tercile. That is, insiders buy relatively more shares ahead of positive stock returns in firms with low foreign institutional ownership. This suggests that they have more latitude to trade on their private information due to the lower transparency of their information environment.[6] Altogether, the results in Table 3 indicate that foreign ownership and government affiliation capture cross-sectional determinants of insiders' ability and willingness to trade ahead of abnormal stock returns.

4.4. Timing of Insider Trades

The results so far suggest that Indian insiders trade on private information that materializes in stock returns in the current and next year, but no conclusive evidence regarding the underlying information they trade upon. Next, we narrow our focus to a short- and most time-sensitive window to examine more closely whether insiders trade on short-term earnings information.

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[6] In untabulated tests, we also partition the sample based on whether firms are cross-listed in the U.S. or not. We find that only insiders in non-cross-listed firms trade profitably. However, power is low in the small cross-listed sample.

Before we examine whether insider trades reported in the run-up to an earnings announcement are informative, we first look at the incidence of those trades. That is, do Indian insiders, in fact, trade at all in the month(s) prior to an earnings announcement? We first address that question graphically. For all insider trades in our sample, we retrieve the closest annual earnings announcement by the firm, and calculate the distance in calendar days between the two. Thus, each trade is assigned to one of twelve months (-6 to -1 or +1 to +6). We then plot the average number of trades (Figure 2a) and the average number of shares traded (Figure 2b) occurring in each monthly bloc. In both figures, we plot means and medians. Two patterns emerge. First, the lines look relatively flat (especially the number of trades), which suggests that insiders trade throughout the fiscal year. Second, there appears to be a slight kink, as the number of trades and shares traded in month -1 drops compared to -2 and +1. The kink would be consistent with some restrictions (or self-restraint) applying to insider trading in the run-up to earnings announcements.

We test whether the monthly variation in insider trading activity is statistically significant by comparing the mean and median number of trades and shares traded in month -1 compared to the rest, as well as month +1 to the rest. Table 4 reports the results. Panel A reports differences between month -1 and the rest of the sample. The mean and median number of trades in month -1 are 4.67 and 3, respectively. Both are lower than their equivalents during other months (mean of 5.61 and median of 3). Furthermore, the differences in means and medians are statistically significant ($p<0.01$ for both). We observe qualitatively similar results using the number of shares traded. For example, insiders trade 904,481 shares on average in month -1 compared to 1,058,554 during other months, the difference being significant ($p<0.10$). However, it should be noted that the differences are not economically significant.

For symmetry, Panel B reports differences between month +1 and the rest of the sample. There is some evidence that insiders trade more in the month following an earnings announcement than during the rest of the year. For example, the mean number of trades during month +1 is 5.92, compared to 5.50 during the rest of the year. The difference is significant ($p<0.05$). However, not all differences are statistically significant (e.g., in terms of mean number of shares traded), and when they are, the economic magnitude is modest. Overall, the takeaway from Figures 1a and 1b and Table 4 is that there is limited evidence that

Indian insiders are restricted to (or refrain from) trading shortly ahead of earnings announcements. We next test if trades timed during that window are informative about the upcoming news releases.

   4.5. Insider Trading and Earnings Response Coefficients

   We estimate Model (2) using an OLS specification, with standard errors clustered by firms. Table 5, Panel A reports the results for the full sample. In the first column, we report results where the indicator *IT* is equal to one if any insider trade occurs between the end of the fiscal year and the earnings announcement, and zero otherwise. The coefficient on *SUE* is positive and significant (coef.=0.20, $p<0.001$). This indicates, as a baseline, that the average earnings announcement in India has a positive ERC. The coefficient suggests a three-day return higher by 0.195% when moving from one decile to the next in terms of *SUE* distribution (remember that *SUE* is replaced with its decile rank). In other words, holding everything else constant, there is a 1.95% higher return for the top compared to the bottom decile of *SUE*. The coefficient on *IT* is positive but not significant at conventional levels. Since *IT* mixes purchases and sales, it is difficult to interpret anyway. However, the coefficient on *SUE*IT* is negative and significant (coef.=-0.13, $p<0.05$). That is, when insiders trade in the run-up to an earnings announcement, the ERC is significantly lower. This is consistent with insider trades preempting some of the earnings' information content. Among the control variables, *PreAnn* has a significantly negative coefficient. This suggests that pre-announcements likely preface bad news, consistent the U.S. practice of earnings warnings (Tucker 1997). Meanwhile, *Bundle*, *Forecast* and *Loss* are not significant. Hence, the mitigating effect of *IT* on the ERC is robust to controls for alternative public signals for earnings.

   In the second column, we report the results where we account separately for observations where insiders are net buyers (*BUY*=1) and net sellers (*SELL*=1). The coefficient on *SUE* continues to be positive and significant, with the same magnitude as in column 1. The coefficient on *BUY* is positive and significant (coef.=1.14, $p<0.05$). This suggests that when insiders buy shares ahead of an earnings announcement, the three-day CAR around the announcement is higher by 1.14%. This is consistent with insiders trading on private information about forthcoming good news, or the market inferring from the joint observation of the trade and the earnings release that the latter signals better news. While the coefficient on *SELL* is negative,

it is not significant. Turning to the interaction terms, we find a negative and significant coefficient on *SUE*BUY* (coef=-0.20, p<0.01). This suggests that earnings announcements preceded by insider purchases have no earnings response coefficient (as per an untabulated F-test, the sum of the coefficients on *SUE* and *SUE*BUY* is insignificantly different from zero). In contrast, the coefficient on *SUE*SELL* is not significant. Hence, it appears as if insider purchases preempt the information content of earnings announcements, while insider sales do not.

To further examine whether insider trading behavior and informativeness thereof varies depending on the direction of the news, we repeat the analysis above separately for earnings surprises in the bottom three deciles (bad news), the middle four (neutral news), and the top three (good news). One the one hand, one might expect insider purchases (sales) to be informative if they precede good (bad) news. However, insiders may wish to signal that news are not as bad as they may seem, thereby purchasing stocks ahead of disappointing earnings. Table 5, Panel B reports the results. Columns 1, 2 and 3 report regression results for bad, neutral and good news, respectively. In terms of sign and statistical significance, the coefficients in column 1 are largely consistent with the full sample. That is, for earnings in the bottom three deciles, there is a positive and significant ERC in the absence of insider purchases, but it is mitigated when insiders are net buyers (as per the negative and significant coefficient on *SUE*BUY*). Also consistent with the full sample, the coefficient on *BUY* is positive and significant. When relatively bad earnings news is released, returns are higher by 2.16% if preceded by insider purchases. In column 2, while positive, the coefficient on SUE is only marginally significant (coef.=0.12, p=0.13). None of the coefficients on *BUY*, *SELL* and the interaction terms with *SUE* is significant. Hence, earnings news, insider trading, and the interaction thereof do not appear to be informative signals around earnings announcements with "neutral" earnings news. The same holds for news in the top three deciles. While the coefficient on SUE is positive and significant (coef=0.24, p<0.10), none of the interaction terms is. Hence, the takeaway from Panel B is that insider purchases signal good news ahead of earnings releases that are otherwise relatively 'bad' when benchmarked against the prior year, and the insider purchasing signal mitigates the ERC in those instances.

4.6. Market Response to Insider Trade Disclosures

As the previous set of tests suggests, insider trades (more specifically, purchases) timed shortly before earnings announcements appear to preempt the information content of the earnings release. One way to further validate this thesis is to test whether the market reaction to the disclosure of those trades is correlated with the yet-to-be disclosed earnings news. We test Model (3) to shed light on this question, using an OLS estimate.

Table 6 reports the results. In the first column, the sample consists of all insider purchase reporting dates, and in the second column, insider sales. In column 1, the coefficient on SUE is positive and significant (coef.=0.147, p<0.10). This indicates that stock returns around disclosures of insider purchases that occur prior to an earnings announcement are positively associated with the forthcoming earnings news. This association holds after controlling for the positive and significant association between trade size and the return around insider purchase disclosures. In column 2, the coefficient on SUE is also positive, but not significant. This suggests that insider sale disclosures are noisier signals about upcoming earnings. Interestingly, there is also a positive and significant coefficient on *Trade Size*: The more shares insiders report selling, the more positive (or less negative) the return around the disclosure of their trade. This is inconsistent with large insider sales signaling bad news. Notwithstanding the significance of trade size, it should be noted that sample size is quite small for insider sales, which suggests limited power for this test.

One possibility, though, is that the association between returns around insider purchase disclosures and subsequent earnings merely reflects an information environment where a variety of sources (analysts, macro news, but also non-observable informed trading) contribute to the incorporation of earnings into stock prices, rather than the disclosed trades per se. To address this possibility, we re-run the analysis from Panel A with 'pseudo' insider trade disclosure dates. That is, we measure returns around the window (+5, +10), where 0 is the insider trade disclosure date. Panel B reports the results. To mirror Panel A, the sample consists of all pseudo insider purchase reporting dates in column 1, and in the second column, pseudo insider sales. The results in both columns indicate that there is no significant association between those

returns and the subsequent earnings surprise (or the trade size).[7] Hence, the evidence in Panel B reinforces our interpretation of the results in Panel A. That is, the market infers upcoming earnings information from insider purchase disclosures.

4.7. Additional tests

4.7.1. Post-Earnings Announcement Drift

Another way to test whether insider purchases improve informational efficiency around earnings announcements is to examine post-announcement returns. Indeed, assuming that Indian markets exhibit some form of PEAD, we may observe that those pre-announcement purchases reduce its magnitude. TO test this conjecture, we re-run Model (2) but with the 30-day post-announcement return (starting two days after the announcement) as the dependent variable.

Table 7 reports the results, using the same structure as Table 5 for comparability. In the first column of Panel A, the coefficient on SUE is positive and significant. This suggests that there is a post-earnings announcement drift in India. However, the incidence of reported insider trades, per se, does not appear to affect it. In column 2, however, two separate patterns emerge for buys and sells. First, the coefficient on BUY is significantly positive and the one on SELL significantly negative. This suggests that pre-announcement insider trades are profitable, and that insiders' private information continues to materialize after earnings announcements. Second, the coefficient on SUE*BUY is negative, albeit marginally significant. However, an untabulated F-test indicates that the sum of the coefficients on SUE and SUE*BUY is insignificant. Hence, there is no PEAD after announcements preceded by insider purchases. Meanwhile, the coefficient on SUE*SELL is positive and significant. That is, there is a stronger drift following announcements that are preceded by insider sales. Given that we previously documented a lack of market reaction to insider sales disclosures (at least with respect to the earnings surprise), this suggests that market participants fail to see the implications of pre-announcement insider sales for the pricing of earnings. That said, note again that there are few observations with insider sales.

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[7] We find similar results when we compute short-window returns around analyst forecast revisions (not tabulated).

Table 7, Panel B reports results by earnings surprise tercile. The findings may be summarized as follows. First, insider purchases precede positive post-announcement returns for bad and neutral news (c.f. the coefficients on BUY in columns 1 and 2) and the predictive ability of insider sales for the PEAD is concentrated in good news announcements (c.f. the coefficient on SUE*SELL in column 3).

Overall, though, the results in Table 7 lend additional support to our interpretation of Tables 5 and 6: Insider purchases timed in the run-up to earnings announcements are informative about the upcoming earnings news and speed up the price discovery process.

4.7.2. Other robustness checks

Our results thus far are largely based on a random walk earnings expectation model. The main advantage of that model is that it does not require analyst forecast data. However, if analysts cover a firm, their forecasts are likely superior to the time-series model in capturing market's earnings expectations. We re-run our tests with an analyst-forecast based earnings surprise measure for firms covered in I/B/E/S. We define *IBESUE* as the difference between actual EPS (as per I/B/E/S) and the latest consensus EPS forecasts (from the non-U.S. summary EPS file), scaled by stock price as of the end of the fiscal year. We also decile-rank the variable by year.

Table 8 reports the results. In Panel A, we replicate Table 5, Panel A, by replacing *SUE* with *IBESUE*. Sample size drops by almost 75%, suggesting limited analyst (or I/B/E/S) coverage. The ERC (i.e., the coefficient on IBESUE) remains significantly positive. While the coefficients on *BUY* and *IBESUE*BUY* are positive and negative as expected, they are not statistically significant. There could be two explanations for this result. First, analyst expectations may incorporate enough of insiders' private information that the insider purchases are a weaker incremental signal for forthcoming earnings. Second, insider purchases may simply be less informative in firms covered by analysts, regardless of the expectations model. To disentangle the two explanations, we re-run Model (2) with SUE as the earnings surprise measure, but only for those firm-years with analyst coverage. Untabulated results indicate that the coefficients on *BUY* and *SUE*BUY* are positive and negative, respectively, and both statistically significant, as in the full model. Hence, the first explanation is more likely: While insider purchases signal earnings

changes, analysts incorporate some of that information in their forecasts, thereby reducing the signaling value of the insider purchases.

4.7.3. Promoters vs. non-promoters

Our analysis thus far includes trades from all insiders subject to SEBI reporting requirements. However, individual insiders' information advantage and trading incentives may vary within a firm. We isolate trades reported by promoters, a category of corporate agents specific to India. Per the Disclosure and Investor Protection (DIP) Code of 2000, a promoter belongs to the following three categories:

(a) The person(s) who are in overall control of the company;

(b) The person(s) who are instrumental in the formulation of a plan or program pursuant to which the securities are offered to the public;

(c) The person(s) named in the prospectus as promoter(s).

Accordingly, not all directors or officers are promoters. However, it is clear from the above that promoters potentially have a significant information advantage. We re-run our main tests separately for promoters and non-promoters. Descriptively, we find that promoters report more transactions than non-promoters, and they tend to buy more shares than they sell, unlike non-promoters. In terms of regression results, we find that our main results are driven by promoters. That is, their annual net purchases precede significantly greater abnormal returns, and their purchases prior to earnings announcements preempt some of the earnings news content. While the coefficients are directionally similar for non-promoters, they are generally not statistically significant (not tabulated). Hence, promoters appear to trade more on their private information than other reporting insiders.

5. Additional Analysis in the M&A Setting

Earnings announcements offer many advantages in analyzing corporate insiders' trading behavior. However, judging from the results in Table 2, Indian corporate insiders mostly trade on private information not captured by earnings news. We use another salient event type – namely, M&A announcements – to test whether corporate insiders trade shortly ahead of major non-earnings news.

We obtain data on M&A events from Prowess. The file contains information on share acquisitions, mergers, and divestitures. We examine separately acquirers and targets. Table 9, Panel A reports descriptive statistics. The sample consists of 3,787 acquirers and 5,054 targets, respectively. The percentage of shares acquired is only reported for 1,800 acquirers and 3,144 targets, though. We only use observations for which the number of shares acquired is available because we use it as a non-return based measure of the significance of the news. From the acquirer's standpoint, the mean (median) percentage of shares acquired is 66% (74%). From the target's standpoint, the mean (median) is 15% (10%). The difference can be explained by the fact that sample firms are publicly-listed companies. While they may be on the acquiring side of takeovers, they are less likely to be on the target side. Instead, the target sample includes smaller stake acquisitions. Mean and median run-up and announcement returns are positive for both samples. The mean 30-day return for targets is 5.89%, compared to an average of 2.33% for the announcement return, suggesting some informed trading takes place in target firms ahead of acquisition announcements.

We use the following regression model to examine stock returns around M&A announcements:

$$CAR\_M\&A_{i,t} = \beta_1*Percent\_Acq_{i,t} + \beta_2*BUY_{i,t} + \beta_3*Percent\_Acq_{i,t}*BUY_{i,t}$$

$$+ \beta_4*SELL_{i,t} + \beta_5*Percent\_Acq_{i,t}*SELL_{i,t}$$

$$+ \beta_6*Book\text{-}to\text{-}Market_{i,t} + \beta_7*Firm\ Size_{i,t} + \Sigma\alpha_j*Year\ FE \qquad (4)$$

We measure the dependent variable, CAR_M&A, over two windows. First, we examine the price run-up to the announcement over the [-30, -1] window, where 0 is the transaction announcement date. For target companies, a price run-up prior to the announcement is usually symptomatic of insider trading. Full-blown or major control stake acquisitions are likely more lucrative for target shareholders. Hence, we expect a positive β_1. While we cannot observe insider trading, we test whether price patterns around M&A announcements differ when corporate insiders report trades in the target's shares prior to the announcement. Consistent with the earnings announcement tests, we create an indicator for insider purchases (BUY) and sales (SELL). We test whether the price run-up is greater when insiders report purchases (a positive coefficient on BUY), and whether the effect is more pronounced for more significant acquisitions (a positive coefficient on BUY*Percent_Acq).

We also test whether M&A announcement returns measured over the [-1,+1] window differ depending on whether corporate insiders trade before the announcement. If the market does not infer insiders' private information about impending deals during the [-30,-1] window, there could be a positive sign on BUY and/or BUY*Percent_Acq. Lastly, for completeness, we also examine acquirer's returns, although we do not formulate expectations for that sample.

Table 9, Panel B reports the regression results for the analysis of M&A run-up and announcement returns in the acquirer's stock. In column (1), the dependent variable is the 30-day CAR preceding the announcement, and column (2) the 3-day CAR around the announcement. In neither case, do we find any evidence of reported insider trades being associated with M&A returns. In fact, only the coefficients on size and book-to-market load, suggesting that our model fails to capture the determinants of acquirer returns. In Panel C, returns are measured in the target's stock. In column (1), the dependent variable is the 30-day CAR preceding the announcement, and column (2) the 3-day CAR around the announcement. In both windows, we find a positive and significant coefficient on Percent_Acq, suggesting that the greater the stake acquired by the acquirer, the greater the target return. Furthermore, in the run-up window, the coefficient on BUY is negative and significant, but the coefficient on BUY*Percent_Acq is positive and significant. This suggests that more substantive acquisitions preceded by insider purchases are also preceded by greater price run-ups. Given the coefficient magnitudes (-4.242 on BUY and +0.364 on BUY*Percent_Acq), the effect of insider purchases is neutral for acquisitions of 11.65% (4.242/0.364). For acquisitions of 20% (the third quartile), price run-ups are 3.04% higher when insiders report stock purchases. Hence, it appears as if insider purchases contribute to targets' price run-up prior to significant M&A announcements.[8] The coefficients on insider buying, selling, and their interaction with Percent_Acq are all insignificant when returns are measured over the short-window announcement. Altogether, the results in Table 9 tend to corroborate those found with earnings announcements: There is some evidence

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[8] However, it should be noted that insiders buy shares ahead of relatively smaller acquisition stakes, which suggests that insiders do not engage in egregious informed purchases prior to M&A (not tabulated).

that reported purchases by target insiders are associated with price run-ups leading to acquisition announcements, but the effect remains modest.

6. Conclusion

We examine the role of disclosed insider trading in the dissemination of earnings news in India. Most prior literature on the association between insider trades and future earnings is based on U.S. data. We revisit this issue in an emerging market, where developing capital market institutions may allow for different insider trading behavior, but also market perception of its informativeness.

We first look at the association between firm-year net insider purchases and subsequent returns and changes in ROA. We find that insiders are more likely to buy shares ahead of positive stock returns, but not ahead of earnings improvements (except in value stocks). Hence, there is limited evidence of Indian insiders trading on near-term earnings information. In partitions based on the ownership structure of the firm, we find that insiders trade more profitably in firms with low foreign institutional ownership, firms that are non-government-affiliated, and to a lesser extent, in non-conglomerate firms. In contrast, promoter ownership bears no association with insider trading profitability. In none of the above partitions do we find evidence that insiders trade on future earnings news.

We then narrow our focus to trades that take place in the run-up to earnings announcements, a time-sensitive window during which many insiders are not allowed to trade in other countries. We find that when insiders buy shares during that window, their trades are associated with higher earnings announcement returns, but no earnings response coefficient. This is consistent with insider purchases preempting the earnings' information content. In addition, we find that insider purchases disclosed during that window elicit market reactions that are positively associated with the earnings to be subsequently announced, and that there is no post-earnings announcement drift for earnings announcements preceded by insider purchases. This, too, suggests that the insider purchases signal the forthcoming earnings, and the market incorporates some of that information upon observing the trades.

Altogether, the results indicate that insider trade and earnings disclosures are informative in India. Furthermore, insider trade disclosures contribute to the incorporation of earnings news into stock price. The results should be informative to Indian regulators in gauging the effectiveness of timely disclosure requirements for insider transactions. While ex post disclosure of insider transactions does not suppress insiders' information advantage, the results suggests that Indian insiders use insider purchases sparsely to signal earnings news, and refrain from engaging in egregious informed trading (especially selling ahead of bad news). While unobservable insider trading could still undermine the integrity of capital markets, the fact that we document a significant earnings response coefficient on average suggests that disclosure can be effective in India.

REFERENCES

Ball, R., and P. Brown. 1968. An empirical evaluation of accounting income numbers. *Journal of Accounting Research* 6 (2): 159-178.

Bernard, V., and J. Thomas. 1989. Post-Earnings-Announcement Drift: Delayed Price Response or Risk Premium? *Journal of Accounting Research* 27: 1-36.

Betzer, A., and E. Theissen, 2009. Insider trading and corporate governance: The case of Germany. *European Financial Management* 15 (2): 402–429.

Bhattacharya, U., H.Daouk, B. Jorgenson, and C-H. Kehr. 2000. When an event is not an event: the curious case of an emerging market. *Journal of Financial Economics* 55: 69-101.

Brochet, F. 2010. Information content of insider trades before and after the Sarbanes-Oxley Act. *The Accounting Review*, 85 (2): 419–446.

DeFond M., M. Hung, and R. Trezevant. 2007. Investor protection and the information content of annual earnings announcement: International evidence. *Journal of Accounting and Economics* 43 (1): 37-67.

Fidrmuc, J., M. Goergen, and L. Renneboog. 2006, Insider trading, news releases and ownership concentration. *Journal of Finance* 61: 2931-2973.

Fidrmuc, J., A. Korczak, and P. Korczak. 2013. Why does shareholder protection matter for abnormal returns after reported insider purchases and sales? *Journal of Banking and Finance* 6: 1915-1935.

Garfinkel, J. 1997. New evidence on the effects of federal regulations on insider trading: The Insider Trading and Securities Fraud Enforcement Act (ITSFEA). *Journal of Corporate Finance* 3: 89-111.

Huddart, S., B. Ke, and K. Petroni. 2003. What insiders know about future earnings and how they use it: Evidence from insider trades. *Journal of Accounting and Economics* 35 (3): 315-346.

Huddart, S., B. Ke, and C. Shi. 2007. Jeopardy, non-public information, and insider trading around SEC 10-K and 10-Q filings. *Journal of Accounting and Economics* 43 (1): 3-36.

Hung. M., Li, X., and S. Wang. 2015. Post-Earnings Announcement Drift in Global Markets: Evidence from an Information Shock. *Review of Financial Studies* 28(4): 1242-1283.

Khanna, T., K. Palepu. 2005. The evolution of concentrated ownership in India broad patterns and a history of the Indian software industry. Working Paper, Harvard Business School.

Korczak, A. P. Korczak, and M. Lasfer. 2010. To trade or not to trade: The strategic trading of insiders around news announcements. Journal of Business Finance and Accounting 37: 369-407

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

Lorie, J., and V. Niederhoffer. 1968. Predictive and statistical properties of insider trading. *Journal of Law and Economics* 11: 35-51.

Piotroski, J., and D. Roulstone. 2005. Do insider trades reflect both contrarian beliefs and superior knowledge about future cash flow realizations? *Journal of Accounting and Economics* 39 (1): 55–82.

Piotroski, J., and D. Roulstone. 2008. Evidence on the non-linear relation between insider trading decisions and future earnings information. *Journal of Law, Economics & Policy* 39: 55-81.

Seyhun, H. 1986. Insiders' profits, costs of trading, and market efficiency. *Journal of Financial Economics* 16 (2): 189-212

Seyhun, H. 1992. Why does aggregate insider trading predict future stock returns? *The Quarterly Journal of Economics* 107: 1303–1331.

Smith, F. 1940. Management trading and stock market profits. *The Journal of Business of the University of Chicago* 13 (2): 103-117.

Tucker, J. 2007. Is openness penalized? Stock returns around earnings warnings. *The Accounting Review* 82 (4): 1055-1087.

Udpa, S. 1996. Insider trading and the information content of earnings. *Journal of Business Finance and Accounting* 23 (8): 1069-1095.

Veenman, D. 2012. Disclosures of insider purchases and the valuation implications of past earnings signals. *The Accounting Review*: 87 (1): 313-342.

Table 1 Descriptive statistics

Panel A: Annual Distribution of Insider Trading

Year	# of unique firms	# of trading insiders per year	# of trades per insider per year
2006	395	3.02	1.61
2007	677	3.78	1.92
2008	791	3.66	2.19
2009	1,073	4.13	3.04
2010	1,215	4.44	2.72
2011	1,200	4.45	3.76
2012	1,224	4.61	3.76
2013	1,269	4.69	3.99
2014	913	4.45	2.69
Total	**2,302**	**4.28**	**3.07**

Panel B: Firm-Year Analysis

Variables	N	Mean	STD	Q1	Median	Q3
Insider Trading: full sample						
$NPR_{i,t}$	19,259	0.09	0.48	0.00	0.00	0.00
No. of purchases	19,114	2.33	9.91	0.00	0.00	0.00
No. of sales	19,114	1.19	12.04	0.00	0.00	0.00
No. of shares purchased per trade	19,114	216,524	3,484,760	0	0	0
No. of shares sold per trade	19,114	218,016	4,746,546	0	0	0
Insider Trading: conditional on at least one trade						
$NPR_{i,t}$	5,581	0.31	0.86	-0.84	1.00	1.00
No. of purchases	5,533	8.06	17.12	1.00	2.00	7.00
No. of sales	5,533	4.11	22.12	0.00	0.00	2.00
No. of shares purchased per trade	4,398	941,029	7,218,309	10,476	48,896	258,096
No. of shares sold per trade	2,724	1,529,796	12,495,225	15,858	109,544	598,630
Performance						
$Ret_{i,t}$	18,636	0.02	0.64	-0.39	-0.16	0.23
$Ret_{i,t+1}$	18,916	0.02	0.61	-0.38	-0.15	0.22
$\Delta ROA_{i,t}$	18,516	-0.01	0.08	-0.03	0.00	0.02
$\Delta ROA_{i,t+1}$	18,736	-0.01	0.08	-0.03	0.00	0.01
Book-to-Market$_{i,t}$	19,259	1.32	1.18	0.44	0.93	1.76
Firm Size$_{i,t}$	19,259	3.28	2.32	1.53	3.01	4.78

Table 1 continued

Panel C: Earnings Announcement Analysis

Variables	N	Mean	STD	Q1	Median	Q3
$SUE_{i,t}$	19,259	4.58	2.89	2.00	5.00	7.00
$IT_{i,t}$	19,259	0.08	0.28	0.00	0.00	0.00
$BUY_{i,t}$	19,259	0.06	0.23	0.00	0.00	0.00
$SELL_{i,t}$	19,259	0.03	0.16	0.00	0.00	0.00
$Bundle_{i,t}$	19,259	0.01	0.08	0.00	0.00	0.00
$PreAnn_{i,t}$	19,259	0.01	0.08	0.00	0.00	0.00
$Forecast_{i,t}$	19,259	-0.05	0.70	0.00	0.00	0.00
$Book\text{-}to\text{-}Market_{i,t}$	19,259	1.32	1.18	0.44	0.93	1.76
$Loss_{i,t}$	19,259	0.18	0.38	0.00	0.00	0.00
$Firm\ Size_{i,t}$	19,259	3.28	2.32	1.53	3.01	4.78

Panel D: Insider Trading Reporting Date Analysis

Variables	N	Mean	STD	Q1	Median	Q3
Insider Purchases						
$CAR\_BUY_{i,j,t}$ (%)	3,027	1.82	10.80	-4.21	0.59	6.01
$SUE_{i,t}$	3,027	4.42	2.86	2.00	4.00	7.00
$Trade\ Size_{i,j,t}$ (%)	3,027	0.38	1.08	0.02	0.06	0.22
$Book\text{-}to\text{-}Market_{i,t}$	3,027	1.43	1.05	0.65	1.14	1.98
$Firm\ Size_{i,t}$	3,027	3.47	1.81	2.21	3.39	4.77
Insider Sales						
$CAR\_SELL_{i,j,t}$ (%)	769	0.77	13.69	-6.42	-0.41	4.74
$SUE_{i,t}$	769	5.36	3.08	3.00	6.00	8.00
$Trade\ Size_{i,j,t}$ (%)	769	1.03	1.85	0.03	0.17	1.02
$Book\text{-}to\text{-}Market_{i,t}$	769	0.98	1.05	0.26	0.63	1.22
$Firm\ Size_{i,t}$	769	4.17	2.36	2.32	4.01	5.86

SUE and book-to-market are winsorized at 5% and 95%, stock returns, ROA, trade size and firm size are winsorized at 1% and 99%. Variable definitions are provided at Appendix A.

Table 2 The relation between insider trades and future performance

Dependent Variable: NPR	(1) At least one trade		(2) Full Sample	
	Coeff.	p-value	Coeff.	p-value
Panel A: Firm-years with IT and full sample				
$Ret_{i,t}$	0.074***	0.001	0.015***	0.006
$Ret_{i,t+1}$	0.073***	0.001	0.029***	0.006
$\Delta ROA_{i,t}$	0.072	0.688	-0.022**	0.043
$\Delta ROA_{i,t+1}$	-0.105	0.565	-0.073**	0.044
Book-to-Market$_{i,t}$	0.051***	0.001	0.011***	0.004
Firm Size$_{i,t}$	-0.052***	<.0001	0.005***	0.002
No. of Obs.		5,533		19,114
Adjusted R^2		0.1762		0.0485
Year Fixed Effects		Yes		Yes
Firm Cluster		Yes		Yes

Dependent Variable: NPR	(1) Low Tercile		(2) Middle Tercile		(3) High Tercile	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Panel B: Partitions by market cap						
$Ret_{i,t}$	0.015*	0.056	0.027***	0.003	0.007	0.566
$Ret_{i,t+1}$	0.017**	0.016	0.037***	0.000	0.016	0.236
$\Delta ROA_{i,t}$	0.055	0.243	0.116*	0.098	-0.254**	0.020
$\Delta ROA_{i,t+1}$	0.031	0.553	-0.038	0.613	-0.087	0.438
Book-to-Market$_{i,t}$	0.010**	0.015	0.016**	0.018	0.052***	<.0001
Firm Size$_{i,t}$	0.028***	<.0001	0.041***	0.000	-0.034***	<.0001
No. of Obs.		5,395		6,641		7,078
Adjusted R^2		0.0379		0.0799		0.0622
Year Fixed Effects		Yes		Yes		Yes
Firm Cluster		Yes		Yes		Yes

Dependent Variable: NPR	(1) Low Tercile		(2) Middle Tercile		(3) High Tercile	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Panel C: Partitions by book-to-market ratio						
$Ret_{i,t}$	0.017*	0.072	0.030***	0.005	0.033***	0.004
$Ret_{i,t+1}$	0.002	0.819	0.033***	0.002	0.040***	<.0001
$\Delta ROA_{i,t}$	-0.150**	0.048	-0.066	0.405	0.194***	0.003
$\Delta ROA_{i,t+1}$	-0.171**	0.037	-0.105	0.196	0.107	0.111
Book-to-Market$_{i,t}$	0.305***	<.0001	-0.007	0.769	-0.012**	0.037
Firm Size$_{i,t}$	-0.000	0.821	0.017***	<.0001	0.027***	<.0001
No. of Obs.		6,315		6,538		6,261
Adjusted R^2		0.0322		0.0808		0.0903
Year Fixed Effects		Yes		Yes		Yes
Firm Cluster		Yes		Yes		Yes

Table 2 continued

This table reports the tests for whether Indian insiders trade on foreknowledge of future returns and earnings news. The dependent variable is NPR (Net Purchase Ratio) in all specifications. We use OLS specification, with year fixed effects (untabulated) and standard errors clustered by firms. In Panel A, the first column includes only firm-years for which there is at least one trade, and the second column includes the full sample. Panel B partitions the full sample into terciles by market capitalization and Panel C by book-to-market ratio.

*** Significant at 1%, ** 5%, and * 10% level, two-tailed tests.

Table 3 The relation between insider trades and future performance by ownership structure

Dependent Variable: NPR	(1) Conglomerate		(2) Non-conglomerate	
	Coeff.	p-value	Coeff.	p-value
Panel A: Conglomerate vs Non-conglomerate				
$Ret_{i,t}$	0.019*	0.076	0.015**	0.041
$Ret_{i,t+1}$	0.016	0.138	0.035***	0.000
$\Delta ROA_{i,t}$	-0.059	0.433	-0.003	0.954
$\Delta ROA_{i,t+1}$	-0.064	0.413	-0.077	0.148
Book-to-Market$_{i,t}$	0.011	0.105	0.012***	0.009
Firm Size$_{i,t}$	-0.003	0.343	0.009***	0.003
No. of Obs.		7,959		11,155
Adjusted R^2		0.0149		0.0142
Year Fixed Effects		Yes		Yes
Firm Cluster		Yes		Yes

Dependent Variable: NPR	(1) Government		(2) Non-government	
	Coeff.	p-value	Coeff.	p-value
Panel B: Government-affiliated vs Non-government				
$Ret_{i,t}$	-0.080*	0.054	0.017***	0.007
$Ret_{i,t+1}$	-0.084**	0.026	0.030***	0.000
$\Delta ROA_{i,t}$	-0.306	0.126	-0.020	0.643
$\Delta ROA_{i,t+1}$	-0.506	0.152	-0.068	0.122
Book-to-Market$_{i,t}$	0.035	0.187	0.011***	0.004
Firm Size$_{i,t}$	0.007	0.312	0.005**	0.048
No. of Obs.		607		18,507
Adjusted R^2		0.0275		0.0146
Year Fixed Effects		Yes		Yes
Firm Cluster		Yes		Yes

Table 3 continued

Dependent Variable: NPR	(1) Low Tercile		(2) Middle Tercile		(3) High Tercile	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Panel C: Partitions by promoter ownership						
$Ret_{i,t}$	0.004	0.736	0.017	0.202	0.027**	0.012
$Ret_{i,t+1}$	0.028**	0.021	0.014	0.244	0.031***	0.005
$\Delta ROA_{i,t}$	-0.018	0.828	0.015	0.853	-0.002	0.970
$\Delta ROA_{i,t+1}$	-0.109	0.215	-0.026	0.770	-0.131*	0.084
Book-to-Market$_{i,t}$	0.009	0.171	0.000	0.953	0.030***	0.000
Firm Size$_{i,t}$	0.012**	0.013	0.010**	0.028	0.007**	0.035
No. of Obs.		5,126		5,208		5,241
Adjusted R^2		0.0073		0.0188		0.0106
Year Fixed Effects		Yes		Yes		Yes
Firm Cluster		Yes		Yes		Yes
	(1) Low Tercile		(2) Middle Tercile		(3) High Tercile	
Dependent Variable: NPR	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Panel D: Partitions by foreign institutional ownership						
$Ret_{i,t}$	0.024	0.108	0.055***	0.009	0.022	0.331
$Ret_{i,t+1}$	0.032**	0.034	0.009	0.602	-0.005	0.804
$\Delta ROA_{i,t}$	-0.023	0.816	0.129	0.293	-0.438**	0.024
$\Delta ROA_{i,t+1}$	-0.085	0.347	0.071	0.633	-0.217	0.253
Book-to-Market$_{i,t}$	0.004	0.640	0.015	0.214	0.020	0.221
Firm Size$_{i,t}$	0.009	0.187	0.001	0.788	-0.021***	0.006
No. of Obs.		2,693		2,488		3,109
Adjusted R^2		0.0240		0.0076		0.0140
Year Fixed Effects		Yes		Yes		Yes
Firm Cluster		Yes		Yes		Yes

This table extends Table 2 and tests by different firm-level ownership structure for whether Indian insiders trade on foreknowledge of future returns and earnings news. The dependent variable is NPR (Net Purchase Ratio) in all specifications. We use OLS specification, with year fixed effects (untabulated) and standard errors clustered by firms. Panel A partitions the sample into whether a firm belongs to a conglomerate or not. Panel B partitions the sample into whether a firm is government-affiliated or not. Panel C partitions the sample into terciles by promoter ownership. Panel D partitions the sample into terciles by foreign institutional ownership.

*** Significant at 1%, ** 5%, and * 10% level, two-tailed tests.

Table 4 Comparison of monthly insider trading activity around earnings announcement

Group	N	Number of Trades			Shares Traded		
		Mean	STD	Median	Mean	STD	Median
Panel A: Month -1 and the Rest							
Month -1	766	4.67	5.06	3.00	904,481	1,984,692	22,000
Rest of the Sample	9,674	5.61	5.87	3.00	1,058,554	2,108,654	28,097
Full Sample	10,440	5.54	5.82	3.00	1,047,250	2,100,101	27,449
p-value for mean difference test				0.000			0.051
p-value for Mood's median test				0.000			0.061
		Number of Trades			Shares Traded		
Group	N	Mean	STD	Median	Mean	STD	Median
Panel B: Month +1 and the Rest							
Month +1	896	5.92	6.12	3.00	1,094,935	2,188,750	26,388
Rest of the Sample	9,544	5.50	5.79	3.00	1,042,773	2,091,649	27,598
Full Sample	10,440	5.54	5.82	3.00	1,047,250	2,100,101	27,449
p-value for mean difference test				0.042			0.477
p-value for Mood's median test				0.142			1.000

This table test whether the monthly variation in insider trading activity is statistically significant. We compare the mean and median number of trades and shares traded in month -1 around earnings broadcast date to the rest (Panel A) and month +1 to the rest (Panel B).

Table 5 The relation between insider trades and stock returns around earnings announcement

	(1)		(2)			
	IT Indicator Only		BUY/SELL Indicators			
Dependent Variable: CAR	Coeff.	*p*-value	Coeff.	*p*-value		
Panel A: Full Sample						
$SUE_{i,t}$	0.195***	<.0001	0.195***	<.0001		
$IT_{i,t}$	0.584	0.126				
$SUE_{i,t} * IT_{i,t}$	-0.134**	0.039				
$BUY_{i,t}$			1.142**	0.011		
$SELL_{i,t}$			-0.866	0.212		
$SUE_{i,t} * BUY_{i,t}$			-0.199***	0.010		
$SUE_{i,t} * SELL_{i,t}$			0.036	0.742		
$Bundle_{i,t}$	0.732	0.271	0.726	0.274		
$PreAnn_{i,t}$	-1.214*	0.060	-1.197*	0.063		
$Forecast_{i,t}$	-0.022	0.753	-0.027	0.711		
$Book\text{-}to\text{-}Market_{i,t}$	0.098	0.105	0.094	0.117		
$Loss_{i,t}$	-0.056	0.723	-0.048	0.762		
$Firm\ Size_{i,t}$	-0.116***	<.0001	-0.114***	<.0001		
No. of Obs.		19,259		19,259		
Adjusted R^2		0.0592		0.0595		
Year Fixed Effects		Yes		Yes		
Firm Cluster		Yes		Yes		

	(1)		(2)		(3)	
	Bad News		Neutral News		Good News	
Dependent Variable: CAR	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
Panel B: Partitions by earnings surprise						
$SUE_{i,t}$	0.278**	0.033	0.121	0.127	0.240*	0.060
$BUY_{i,t}$	2.158***	0.003	-0.001	0.999	0.986	0.796
$SELL_{i,t}$	-0.647	0.554	0.635	0.770	-1.486	0.731
$SUE_{i,t} * BUY_{i,t}$	-1.170**	0.037	-0.018	0.956	-0.137	0.771
$SUE_{i,t} * SELL_{i,t}$	-0.698	0.417	-0.190	0.672	0.137	0.798
$Bundle_{i,t}$	-0.851	0.568	1.718	0.110	1.074	0.203
$PreAnn_{i,t}$	-1.088	0.461	-0.463	0.715	-1.654*	0.068
$Forecast_{i,t}$	-0.025	0.829	0.093	0.463	-0.068	0.503
$Book\text{-}to\text{-}Market_{i,t}$	0.060	0.562	0.039	0.674	0.274**	0.032
$Loss_{i,t}$	0.070	0.759	0.064	0.806	-0.898**	0.047
$Firm\ Size_{i,t}$	-0.095*	0.084	-0.094**	0.041	-0.167***	0.000
No. of Obs.		5,698		7,532		6,029
Adjusted R^2		0.0534		0.0553		0.0816
Year Fixed Effects		Yes		Yes		Yes
Firm Cluster		Yes		Yes		Yes

Table 5 continued

This table reports the tests for whether insider trading shortly ahead of earnings announcements is informative about the upcoming news release. The dependent variable is three-day cumulative market-adjusted returns (CAR) around earnings broadcast date. We use OLS specification, with year fixed effects (untabulated) and standard errors clustered by firms. In Panel A, the first column reports the results with IT indicator, which is equal to one if any insider trade occurs between the end of the fiscal year and the earnings announcement. The second column accounts separately for observations where insiders are net buyers (*BUY*=1) and net sellers (*SELL*=1). Panel B repeats the specification using *BUY* and *SELL* indicators separately for earnings surprises in (1) the bottom three deciles (bad news), (2) the middle four (neutral news), and (3) the top three (good news).
*** Significant at 1%, ** 5%, and * 10% level, two-tailed tests.

Table 6 The relation between the disclosure of insider trades and stock returns

	(1) Insider Purchases		(2) Insider Sales	
Dependent Variable: (1) CAR_BUY, (2) CAR_SELL	Coeff.	*p*-value	Coeff.	*p*-value
Panel A: Five-day CAR around Insider Trade Disclosures				
$SUE_{i,t}$	0.147*	0.051	0.186	0.437
Trade Size$_{i,j,t}$	46.118*	0.053	72.594**	0.025
Book-to-Market$_{i,t}$	0.553**	0.036	0.118	0.862
Firm Size$_{i,t}$	-0.073	0.618	-0.043	0.881
No. of Obs.		3,027		769
Adjusted R^2		0.1306		0.0211
Year Fixed Effects		Yes		Yes
Firm Cluster		Yes		Yes
	(1) Insider Purchases		(2) Insider Sales	
Dependent Variable: (1) CAR_BUY, (2) CAR_SELL	Coeff.	*p*-value	Coeff.	*p*-value
Panel B: Five-day CAR around pseudo insider trade disclosure				
$SUE_{i,t}$	-0.000	0.992	-0.129	0.456
Trade Size$_{i,j,t}$	-0.080	0.996	0.160	0.993
Book-to-Market$_{i,t}$	0.479*	0.077	0.246	0.690
Firm Size$_{i,t}$	-0.117	0.382	-0.021	0.918
No. of Obs.		2,832		751
Adjusted R^2		0.0718		0.0172
Year Fixed Effects		Yes		Yes
Firm Cluster		Yes		Yes

This table reports the tests for whether the market reaction to the disclosure of insider trades is correlated with the yet-to-be disclosed earnings news. The dependent variables are CAR_BUY (SELL), which represent five-day cumulative abnormal return starting from the day an insider purchase (sale) is reported through Securities and Exchange Board of India (SEBI). We use OLS specification, with year fixed effects (untabulated) and standard errors clustered by firms. In Panel A, the first column reports the results with all insider purchases and the second column with all insider sales. In Panel B, we re-run the analysis from Panel A with 'pseudo' insider trade disclosure dates. That is, we measure returns around the window (+5, +10), where 0 is the insider trade disclosure date. To mirror Panel A, the sample consists of all pseudo insider purchase reporting dates in column 1 and pseudo insider sales in column 2.
*** Significant at 1%, ** 5%, and * 10% level, two-tailed tests.

Table 7 The relation between insider trades and post earnings announcement stock returns

	(1)		(2)		
	IT Indicator Only		BUY/SELL Indicators		
Dependent Variable: CAR	Coeff.	p-value	Coeff.	p-value	
Panel A: Full Sample					
$SUE_{i,t}$	0.494**'	<.0001	0.495**'	<.0001	
$IT_{i,t}$	1.285	0.256			
$SUE_{i,t} * IT_{i,t}$	-0.038	0.846			
$BUY_{i,t}$			3.384**'	0.010	
$SELL_{i,t}$			-3.689*	0.055	
$SUE_{i,t} * BUY_{i,t}$			-0.321	0.168	
$SUE_{i,t} * SELL_{i,t}$			0.626**	0.048	
$Bundle_{i,t}$	-0.580	0.786	-0.618	0.772	
$PreAnn_{i,t}$	0.406	0.846	0.450	0.829	
$Forecast_{i,t}$	0.101	0.590	0.084	0.657	
$Book\text{-}to\text{-}Market_{i,t}$	0.115	0.572	0.105	0.605	
$Loss_{i,t}$	-0.828	0.112	-0.803	0.123	
$Firm\ Size_{i,t}$	-0.675**'	<.0001	-0.672**'	<.0001	
No. of Obs.		19,018		19,018	
Adjusted R^2		0.2048		0.2051	
Year Fixed Effects		Yes		Yes	
Firm Cluster		Yes		Yes	

	(1)		(2)		(3)	
	Bad News		Neutral News		Good News	
Dependent Variable: CAR	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Panel B: Partitions by earnings surprise						
$SUE_{i,t}$	0.599	0.168	0.077	0.782	0.171	0.702
$BUY_{i,t}$	3.859**	0.045	8.760*	0.089	-7.574	0.511
$SELL_{i,t}$	-3.422	0.246	-1.424	0.864	-31.46**	0.014
$SUE_{i,t} * BUY_{i,t}$	-1.106	0.488	-1.610	0.121	1.131	0.431
$SUE_{i,t} * SELL_{i,t}$	-0.364	0.870	0.385	0.830	4.064**	0.011
$Bundle_{i,t}$	-4.307	0.348	6.066	0.162	-2.885	0.306
$PreAnn_{i,t}$	-1.276	0.808	2.860	0.478	0.678	0.809
$Forecast_{i,t}$	0.489	0.143	0.260	0.510	0.021	0.944
$Book\text{-}to\text{-}Market_{i,t}$	0.175	0.598	0.276	0.396	-0.031	0.943
$Loss_{i,t}$	-0.583	0.430	0.295	0.756	-3.093**	0.049
$Firm\ Size_{i,t}$	-0.078	0.659	-0.650**'	<.0001	-1.023**'	<.0001
No. of Obs.		5,603		7,452		5,963
Adjusted R^2		0.1726		0.1873		0.2626
Year Fixed Effects		Yes		Yes		Yes
Firm Cluster		Yes		Yes		Yes

Table 7 continued

This table reports the tests for whether insider trading shortly ahead of earnings announcements is informative about the post-earnings announcement drift. The dependent variable is thirty-day cumulative market-adjusted returns (CAR) starting two days after the earnings broadcast date. We use OLS specification, with year fixed effects (untabulated) and standard errors clustered by firms. In Panel A, the first column reports the results with IT indicator, which is equal to one if any insider trade occurs between the end of the fiscal year and the earnings announcement. The second column accounts separately for observations where insiders are net buyers (*BUY*=1) and net sellers (*SELL*=1). Panel B repeats the specification using *BUY* and *SELL* indicators separately for earnings surprises in (1) the bottom three deciles (bad news), (2) the middle four (neutral news), and (3) the top three (good news).
*** Significant at 1%, ** 5%, and * 10% level, two-tailed tests.

Table 8 The relation between insider trades and stock returns with analyst coverage

	(1)	
	Full Sample	
Dependent Variable: CAR	Coeff.	*p*-value
Panel A: Earnings Announcement Returns		
$IBESUE_{i,t}$	0.270***	<.0001
$BUY_{i,t}$	1.350**	0.033
$SELL_{i,t}$	-0.184	0.859
$IBESUE_{i,t} * BUY_{i,t}$	-0.170	0.159
$IBESUE_{i,t} * SELL_{i,t}$	-0.056	0.774
$Bundle_{i,t}$	0.027	0.969
$PreAnn_{i,t}$	-0.487	0.511
$Forecast_{i,t}$	-0.004	0.948
$Book\text{-}to\text{-}Market_{i,t}$	-0.338*	0.087
$Loss_{i,t}$	-0.432	0.309
$Firm\ Size_{i,t}$	-0.212***	0.001
No. of Obs.	5,043	
Adjusted R^2	0.0688	
Year Fixed Effects	Yes	
Firm Cluster	Yes	

	(1)		(2)	
	Insider Purchases		Insider Sales	
Dependent Variable: (1) CAR_BUY, (2) CAR_SELL	Coeff.	*p*-value	Coeff.	*p*-value
Panel B: Market Reaction to Insider Trade Disclosures				
$IBESUE_{i,t}$	0.075	0.452	0.799**	0.008
$Trade\ Size_{i,j,t}$	17.206	0.728	54.242	0.401
$Book\text{-}to\text{-}Market_{i,t}$	-0.370	0.544	1.002	0.354
$Firm\ Size_{i,t}$	-0.520	0.102	0.368	0.387
No. of Obs.	1,038		344	
Adjusted R^2	0.0843		0.0397	
Year Fixed Effects	Yes		Yes	
Firm Cluster	Yes		Yes	

This table reports the tests whether analyst coverage affects the relation between insider trades and stock returns around earnings announcement. We re-run our tests in Table 4 and Table 5 with *IBESUE*, an analyst-forecast based earnings surprise measure for firms covered in I/B/E/S. The dependent variables are *CAR* for Panel A and *CAR_BUY (SELL)* for Panel B. We use OLS specification, with year fixed effects (untabulated) and standard errors clustered by firms. Panel A tests whether insider trading shortly ahead of earnings announcements from firms covered by analysts is informative about the upcoming news release. Panel B tests whether the market reaction to the disclosure of insider trades from firms covered by analysts is correlated with the yet-to-be disclosed earnings news. The first column reports the results with all insider purchases and the second column with all insider sales.

*** Significant at 1%, ** 5%, and * 10% level, two-tailed tests.

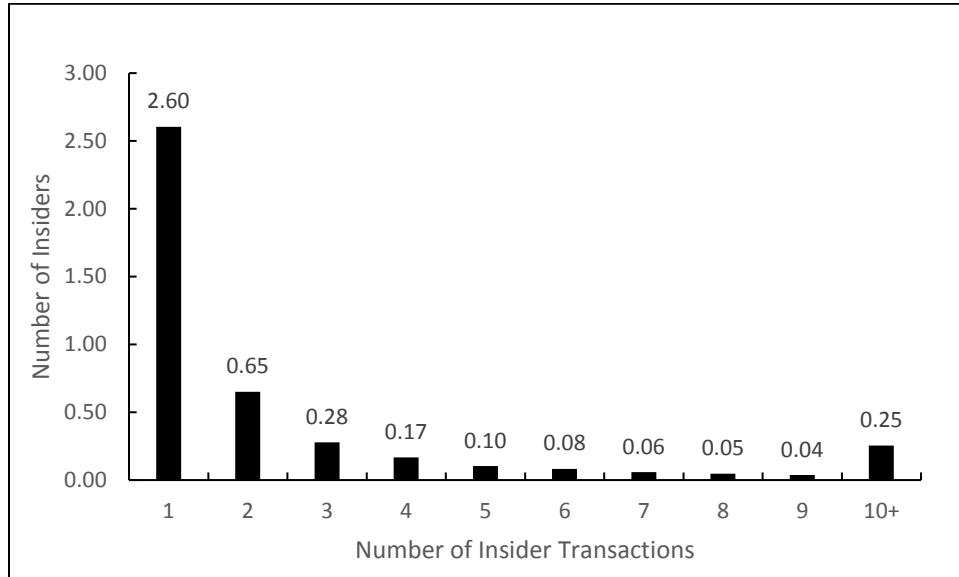**Table 9** The relation between insider trades and M&A announcement returns

Variables	N	Mean	STD	Q1	Median	Q3
Panel A: Descriptive Statistics						
Acquirer						
CAR_M&A[-30, -1]$_{i,t}$ (%)	3,776	1.22	7.91	-3.36	0.79	5.56
CAR_M&A[-1, 1]$_{i,t}$ (%)	3,776	4.69	21.86	-7.88	4.79	16.88
PERCENT_Acq$_{i,t}$	1,800	66.42	34.54	39.54	74.00	100.00
BUY$_{i,t}$	3,787	0.06	0.23	0.00	0.00	0.00
SELL$_{i,t}$	3,787	0.04	0.19	0.00	0.00	0.00
Target						
CAR_M&A[-30, -1]$_{i,t}$ (%)	5,033	2.33	8.74	-3.09	1.68	7.15
CAR_M&A[-1, 1]$_{i,t}$ (%)	5,034	5.89	23.71	-7.19	4.61	18.49
PERCENT_Acq$_{i,t}$	3,144	15.27	15.51	5.00	10.35	20.00
BUY$_{i,t}$	5,054	0.07	0.25	0.00	0.00	0.00
SELL$_{i,t}$	5,054	0.05	0.21	0.00	0.00	0.00

	(1)		(2)	
	Acquirer		Acquirer	
Dependent Variable: (1) CAR[-30, -1], (2) CAR[-1, 1]	Coeff.	*p*-value	Coeff.	*p*-value
Panel B: Regression Results for Acquirer Sample				
PERCENT_Acq$_{i,t}$	0.007	0.736	0.004	0.459
BUY$_{i,t}$	-0.029	0.993	2.001	0.175
PERCENT_Acq$_{i,t}$ * BUY$_{i,t}$	0.019	0.769	-0.023	0.294
SELL$_{i,t}$	0.727	0.875	0.267	0.871
PERCENT_Acq$_{i,t}$ * SELL$_{i,t}$	-0.020	0.775	0.014	0.511
Book-to-Market$_{i,t}$	-4.835***	0.000	-0.215	0.487
Firm Size$_{i,t}$	-0.951***	0.010	-0.320**	0.011
No. of Obs.		1,772		1,772
Adjusted R^2		0.1650		0.0403
Year Fixed Effects		Yes		Yes
Firm Cluster		Yes		Yes

	(1)		(2)	
	Target		Target	
Dependent Variable: (1) CAR[-30, -1], (2) CAR[-1, 1]	Coeff.	*p*-value	Coeff.	*p*-value
Panel C: Regression Results for Target Sample				
PERCENT_Acq$_{i,t}$	0.175***	0.000	0.045***	0.001
BUY$_{i,t}$	-4.242*	0.051	0.070	0.942
PERCENT_Acq$_{i,t}$ * BUY$_{i,t}$	0.364**	0.024	0.036	0.592
SELL$_{i,t}$	0.618	0.807	0.048	0.969
PERCENT_Acq$_{i,t}$ * SELL$_{i,t}$	0.035	0.797	-0.020	0.721
Book-to-Market$_{i,t}$	-2.545***	0.000	-0.240*	0.100
Firm Size$_{i,t}$	0.305	0.162	-0.310***	0.000
No. of Obs.		2,893		2,893
Adjusted R^2		0.1017		0.0230
Year Fixed Effects		Yes		Yes
Firm Cluster		Yes		Yes

Table 9 continued

This table tests whether corporate insiders trade shortly ahead of M&A announcements. We examine separately acquirers and targets. Panel A reports descriptive statistics. Panels B and C report regression results for the analysis of M&A run-up and announcement returns in the acquirer's stock and target's stock, respectively. The dependent variables are (1) 30-day CAR preceding the announcement, and (2) 3-day CAR around the announcement. We use OLS specification, with year fixed effects (untabulated) and standard errors clustered by firm.
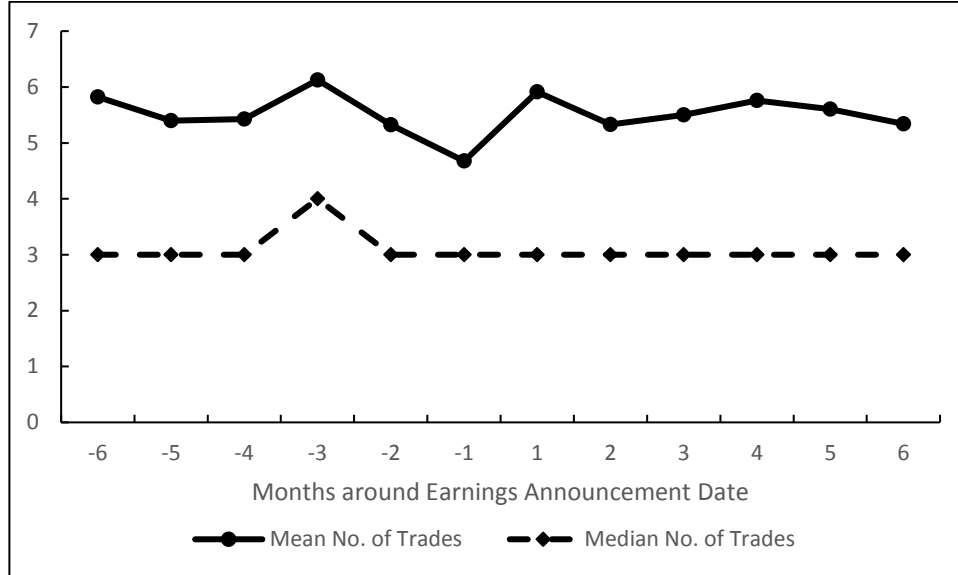*** Significant at 1%, ** 5%, and * 10% level, two-tailed tests.

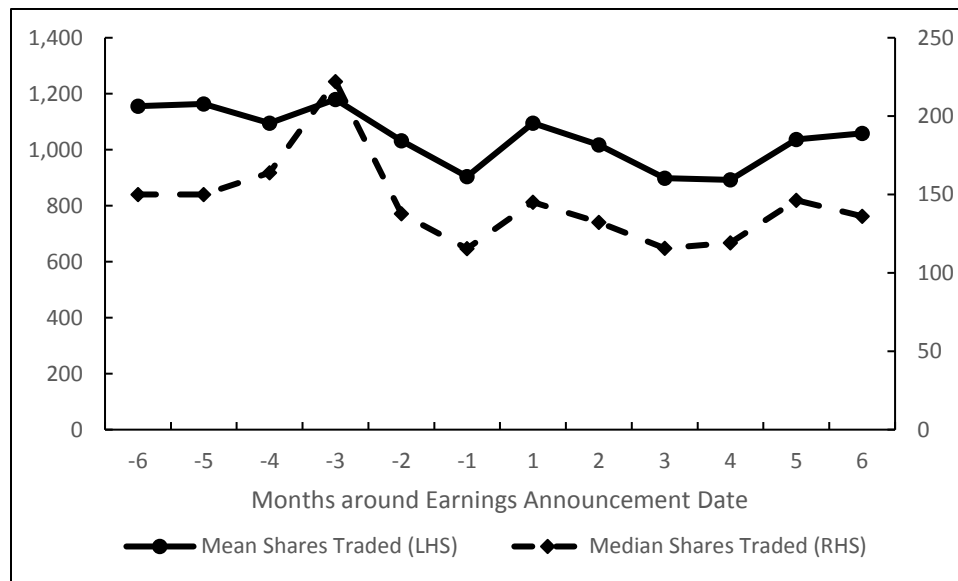**Figure 1** Distribution of annual number of insider transactions

This figure presents the histogram of annual average number of trades per firm. Each bar represents the number of insiders associated with the corresponding number of insider transactions.

Figure 2(a) Monthly number of trades around earnings announcement

This figure presents the monthly average (median) number of trades per firm around the earnings announcement date. Each monthly bloc represents a 30-day period, with month -1 ending one day before the earnings announcement and month +1 starting on the earnings announcement.

Figure 2(b) Monthly number of shares traded around earnings announcement

This figure presents the monthly average (median) number of shares traded per firm around the earnings announcement date. Each monthly bloc represents a 30-day period, with month -1 ending one day before the earnings announcement and month +1 starting on the earnings announcement. The mean shares traded are represented in the left vertical axis and the median in the right vertical axis. The labels on vertical axes represent thousands of shares.

Appendix A Variable definition

Variables	Definition
Insider Trading	
IT	Indicator variable equal to one if there is any open-market insider purchase or sale reported between the end of fiscal year and the earnings broadcast date
BUY	Indicator variable equal to one if the number of open-market insider purchases exceeds that of open-market insider sales ahead of the earnings broadcast date
SELL	Indicator variable equal to one if the number of open-market insider sales exceeds that of open-market insider purchases ahead of the earnings broadcast date
Trade Size	Number of shares reported as bought or sold, scaled by shares outstanding
NPR	Net purchase ratio defined as the difference between the number of shares bought and the number of shares sold by insiders over the fiscal year, scaled by the total number of shares traded
Performance	
ΔROA	Income before extraordinary items (IB in COMPUSTAT Global) at the end of fiscal year minus that of the previous fiscal year, scaled by average total assets
Book-to-Market	Firm's book value of common equity to its market capitalization as of the beginning of the year
Firm Size	Natural logarithm of firm's market capitalization
Loss	Indicator variable equal to one if the firm's reported earnings are negative
Surprise Proxy	
SUE	Difference between reported earnings per share (EPS) and one-year-lagged EPS, scaled by the standard deviation of past differences in EPS over three to five years depending on data availability
IBESUE	Difference between actual EPS (as per I/B/E/S) and the latest consensus EPS forecasts (from the non-U.S. summary EPS file), scaled by stock price as of the end of the fiscal year
Return	
Ret	Market-adjusted return over the fiscal year
CAR	Three-day cumulative market-adjusted returns around earnings broadcast date
CAR_BUY (SELL)	Five-day cumulative abnormal return starting from the day an insider purchase (sale) is reported through Securities and Exchange Board of India (SEBI)
Disclosure	
Bundle	Indicator variable equal to one if earnings announcements coincide with the issuance of a forecast for the next year's earnings or another performance metric, as per Capital IQ Key Developments
PreAnn	Indicator variable equal to one if earnings announcements are preceded by the issuance of a forecast for the next year's earnings or another performance metric, as per Capital IQ Key Developments
Forecast	Categorical variable equal to 1 (-1) if the number of positive (negative) analyst EPS forecast revisions issued between the end of the fiscal year and the earnings broadcast date exceeds the number of negative (positive) forecast revisions