Insider Trading Restrictions and Informed Trading in Peer Stocks*

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March 14, 2022

* We appreciate helpful suggestions and comments from Vikas Agarwal, Shashwat Alok, Bhagwan Chowdhry, Alan Jagolinzer, Apoorva Javadekar, Bjorn Jorgensen, Mihir Mehta, Katie Moon (Discussant), Andrea Rossi, Vikrant Vig, Qifei Zhu (Discussant) and participants in the workshops at University of Arizona, University of Southern California, Indian School of Business, Indian Institute of Management, the Corporate Governance and Executive Compensation Research Series, the NSE-NYU Stern Conference on the Indian Financial Markets, American Accounting Association Annual Meeting, Accounting Research Conference at UIC, and the American Finance Association Annual Meeting. We are grateful for the financial support provided by the NSE-NYU Stern Initiative on the Study of Indian Financial Markets.
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Abstract

Using a uniquely constructed dataset of trades by corporate insiders in all stocks, we find that insiders partially substitute trades in their own stocks with informed trades in peer stocks after insider trading regulations become stricter. Insiders trade more often and more profitably in peer stocks following the change. The increase in both the probability and profitability of peer-stock trades is driven by the insider's information that is fungible to industry peers. Finally, peer trading dampens improvements in liquidity and more informative prices, the intended benefits of the insider trading regulation.

Key Words: Insider trading regulation, Informed trading, Information fungibility, Price informativeness, Liquidity

JEL Codes: D4, D82, G14, K22

1. Introduction

Insider trading laws are often justified using arguments of fairness and integrity of financial markets. Stricter insider trading laws can reduce adverse selection and improve liquidity in capital markets by limiting managers' ability to profit from their superior firm-specific information. Little is known about whether and how managers compensate for these lost trading opportunities. We examine whether managers, at least partially, substitute insider trades with informed trades in peer-firm stocks based on information that is fungible. If they did, such cross-trading by managers would change the composition of informed traders for any given firm. Specifically, while insider trades reduce, there will be an increase in informed trading by peer-firm managers. Additionally, we investigate whether the change in the composition of informed traders has implications for liquidity and stock price informativeness.

A significant challenge in addressing these questions is the lack of data on insiders' trades in peer-firm stocks since these trades are not disclosed. Further, a clean identification of the effect of insider trading laws requires significant changes in the regulation. To overcome the first challenge, we use a proprietary dataset to capture insiders' trades in their own firms and peer firms. We match the reported trades of Indian corporate insiders with a proprietary dataset of all trades on the Bombay Stock Exchange (BSE), a major stock exchange in India. The BSE trade dataset has anonymized trader identifiers that allow us to track the same trader throughout our sample. The matching yields a final sample of 943 insiders corresponding to 17,367 trades in own stock and peer stocks, i.e., other stocks in the industry of insider's own firm, for the period 2012 through 2017.

To cleanly identify a shock to insider trading regulation, we exploit the 2015 Prohibition of Insider Trading Regulation (PITR) by the Securities and Exchange Board of India (SEBI). The 2015 PITR was adopted to overhaul insider trading laws and increase

enforcement powers of SEBI, and many of the changes were shaped by insider trading laws in the US and UK (Dey, 2016). When the regulation came out, the financial news media described it as stricter than the older regulation and in line with global standards.[1] Using this regulation, we examine (i) changes in trading behavior and profitability of trades by insiders in their own stocks and peer stocks and (ii) consequences of this change for liquidity and price informativeness in the market. Our tests involving insiders' trades in their own stocks provide further validation about the effectiveness of the new regulation.

Absent legal ramifications of insider trading, insiders would prefer to exploit their superior information about their own firm by trading in their own stock rather than using it indirectly by trading in the peer stocks. But when stricter insider trading laws limit their ability to conduct informed trading in their own stock, we conjecture that insiders are likely to apply that information to the next best use, i.e., trading in peer stocks. Additionally, after the regulation, they would be less concerned about trading in peer stocks against better-informed peer-firm insiders because those trades of the peer-firm insiders in their own firm are also curtailed by the law. The combination of the limits to trading in own stock and the improved competitiveness of trades in peer stocks leads us to predict that insiders will partially substitute their own-stock trades with peer-stock trades. Figure 1 depicts the predicted change in informed trading in own and peer stocks. We define peer stocks as stocks in the same industry as the insider's own firm based on the insights from Ben-David, Birru, and Rossi (2019) who show that insiders trade profitably in stocks in their industry relative to firms in other industries. While insiders are likely to trade in peer stocks for various reasons even prior to the regulation,

[1] "Market regulator SEBI today notified a stricter set of insider trading norms to check illicit transactions in shares of listed firms by management personnel and 'connected persons'" Economic Times, Jan 15th, 2015. https://economictimes.indiatimes.com/sebi-notifies-stringent-insider-trading-norms/printarticle/45900478.cms accessed on April 24th, 2021. "The new regulations appear to be promising, more practical, and largely in line with the global approach to insider trading. They also seem to be equipped to ensure better compliance and enforcement." Mint, March 10th, 2015. https://www.livemint.com/Money/qMDHjPWNMJLza41fy8LWBO/What-Sebis-new-insidertrading-rules-mean-and-where-they-fa.html accessed on April 24th, 2021.

the insider trading restrictions create an additional reason to trade in them, i.e., to compensate for the lost trading opportunities in their own stock. Thus, we hypothesize that, after the new regulation, insiders' informed trading in their own stocks goes down and increases in peer stocks.

We examine both the likelihood and profitability of trades. We measure profitability using abnormal returns over six-month horizons for each of the insider trades using size, book-to-market, and momentum-matched benchmark portfolios, following Daniel, Grinblatt, Titman, and Wermers (1997) and Wermers (2004) (overall DGTW-adjusted returns). As a baseline, we first establish that the regulation has intended consequences for insider trading. We find that the likelihood of own-stock trades in a given quarter and the associated abnormal returns from such trades decrease after controlling for individual insider's skill and information processing ability through insider fixed effects. These results show that the insider trading regulation is effective in curbing informed trading by insiders in their own stocks.

When we examine peer-stock trades, we find that both the likelihood profitability of trades go up after the new regulations. We expect both these effects to be stronger when insiders have greater access to fungible information. An insider's information about own firm is more likely to translate to actionable intelligence about the peer stocks when the own stock comoves more with the industry. Thus, we use insider's own stock's comovement with the industry as a proxy for the fungibility of insider's information. There is an increase in the likelihood of peer-stock trades only when the industry comovement is high. Likewise, insiders earn abnormal profits on peer-firm trades only when industry comovement is high. These results, combined with lower probability and reduced profitability of own-stock trades, are consistent with insiders switching their informed trading from own stocks to peer stocks when they have access to fungible information.

Next, we examine the sources of profitability for own-stock and peer-stock trades to provide support for the idea that the trades are driven by fungible information. We parse the overall abnormal returns from each trade into its two components – the average industry and the firm-specific components. To the extent firms in the same industry are affected by the common industry-wide factors, the industry component of news is more fungible to industry peers. Accordingly, we expect and find that the industry component of returns is significantly higher for peer-firm trades after the regulation. As expected, there is no change in the firm-specific component.[2] Further, we find evidence consistent with insiders reducing the use of firm-specific news to trade in their own stock in response to stricter regulations.

The fungibility of information between the own stock and the peer stock can go beyond the industry component. We capture it directly using pair-wise correlation over the pre-regulation period between an own stock and all the related stocks. As expected, the trades in peer stocks that have highly correlated returns with own-stock returns become more profitable. Further, the improvement in profitability is almost entirely explained by the industry-adjusted own stock returns on a similar hypothetical trade in the own stock. The evidence about this pseudo-return on a trade forgone in their own stock provides strong support for the hypothesis that, in light of stricter regulation, insiders switch from own-stock trades to peer-stock trades to exploit their information advantage about their own firm. The increased profitability appears to be driven by information that is related to the trader's own stock rather than traded-firm-specific information. Thus, our evidence is inconsistent with information leakage or tipping by the traded stock's insiders.

[2] It is possible that industry expertise enables insiders to earn superior firm-specific returns for peer trades. However, the change in insider trading regulations does not affect this aspect of informed trading and indeed we see that the firm-specific component of peer-trade profitability remains unchanged.

Taken together, our results suggest that as insider trading regulation gets stricter, insiders refrain from trading in their own stock using information about their own firm. Instead, they use information common between their own firm and peer firms to trade profitably in peer stocks. These results are robust to a battery of tests such as looking at trades around earnings announcements, including non-peer stocks in the analysis, controlling for governance, using alternative definitions of pre- and post-regulation periods, examining profitability over a 3-month return horizon, and focusing exclusively on purchase transactions by insiders.

It is worth noting that the opportunity for profitable peer stock trading is available to insiders even before the regulation. However, as we document, the increase in the profitability of peer stocks after the new regulation is driven by fungible information about their own stock. Before the regulation, the best way for the insiders to exploit this information was by trading in their own stock. After the stricter insider trading law, insiders take advantage of this information in the next best manner by increasing trading in peer stocks based on information common between own and peer firms.

Our findings of reduced informed trading in own stock and increased cross-trading in peer stocks, triggered by insider trading laws, imply an alteration in the mix of informed traders in any given firm. A natural question that follows is how this change affects information flow to capital markets, information asymmetry, and stock liquidity. There is a longstanding academic debate on the pros and cons of insider trading laws that restrict insiders from using their superior information to trade in their own stock. Insider trading regulations, by discouraging informed insider trading, typically improve liquidity and change price informativeness. For our next set of analyses, we separately examine the effect of insider trading laws and the consequent cross-trading by peer-firm insiders on these two attributes. Building on our previous results, we predict that the effects of increased peer-trading on

liquidity and price informativeness would go the opposite direction of reduced own-stock-trading and they would be greater when there is higher industry comovement.

Restriction on insider trading is expected to reduce adverse selection concerns of uninformed investors, which improves liquidity (Leland, 1992). However, there could be a dampening effect due to an increase in informed trades by peer-firm managers. As a result, the adverse selection problem could persist even after the insider trading regulation. We thus predict that the liquidity gains from insider trading laws can be diminished as trades by peer-firm managers increase. The results are consistent with this prediction. Using the Amihud (2002) measure of illiquidity for the firms of identified insiders, we find that liquidity improves for firms with low expected peer-firm trading, proxied by low industry comovement. But this effect is significantly dampened for firms with high industry comovement. Thus, this new class of informed traders (peer-firm insiders) hurts market liquidity. The net effect is that after the regulation, liquidity does not improve for high comovement firms.

Insiders' trades in their own stocks and the disclosure of such trades can convey private information that may be otherwise difficult to credibly disclose to the market.[3] Thus, when insiders limit informed trading in their own stocks, there can be a reduction in the price informativeness (Manne, 1966; Carlton and Fischel, 1983; Udpa, 1996; Choi, Faurel, and Hillegeist, 2021). On the other hand, the incentives of outsiders for information acquisition may improve with stricter insider trading regulation, thus improving price informativeness (Fishman and Hagerty, 1992; Bushman, Piotroski, and Smith, 2005). Fernandes and Ferreira (2009) find that following first-time implementation of insider trading regulation, prices

[3] Meulbroek (1992), Cornell and Sirri (1992), and Chakravarty and McConnell (1997) show that prices move in the direction of the insider trade on days with insider trading, but Chakravarty and McConnell (1999) find no discernable difference in price movements to informed versus uninformed trades. To the extent the insiders have capital constraints and cannot trade until their private information is fully incorporated into the stock price, disclosure of the trades can convey additional information to the market. Indeed, Jaffe (1974b) and Brochet (2010) document a stock market reaction to disclosure of insider trades.

become more informative in developed markets but not in emerging markets. Both the mechanisms through which insider trading in own stocks affects price informativeness are likely to be weakened by peer trading.

We follow Kacperczyk, Sundaresan, and Wang (2021) to measure price informativeness by how well prices predict future earnings. We also use three other alternative measures used by them: price non-synchronicity, jump ratio, and adjusted variance ratio. We find some evidence that after the regulation, prices become more informative for low comovement firms. But this improvement is fully or partly offset for high comovement firms, i.e., in situations with greater potential for peer-trading.

Our paper extends the literature on insider trading and, more generally, informed trading. Research on insiders' trades in other stocks is limited because such data are not readily available. A few recent studies innovatively capture insider trades in other stocks (Tookes, 2008; Johannesson, 2018; Ben-David, Birru, and Rossi, 2019; Berkman, Koch, and Westerholm, 2020). [4] In a related paper, Mehta, Reeb, and Zhao (2021) infer shadow trading from increased informed trading in economically linked firms around news events of a firm. As the authors point out, this observed increase in informed trading could either be a result of direct trading or information leakage by corporate insiders. We contribute to this literature by providing evidence, using actual trade data, that when faced with stricter insider trading regulation, the corporate insiders shift their informed trading away from their own stock and towards other stocks in the same industry. Additionally, we show that the profitability of these related trades is driven primarily by information that is common between the own stock and the particular related stock. Our evidence suggests that trades by peers are based on their own information rather than information leakage by the traded stock's insiders. Further, we provide

[4] Coming at the question of insider trading from a different angle, Alldredge and Cicero (2015) look at insiders trading in their own stock but based on information spillover from connected firms.

empirical support for the theoretical models such as in Chen and Jorgensen (2021), that predict informed trading by peer-firm managers. Finally, because we use a shock to insider trading regulations, we are also able to speak to the consequences of such cross-trading on the effectiveness of these regulations.

A small but growing literature assesses how insiders change their trading behavior in response to changing regulation, enforcement, or legal risk. Del Guercio et al. (2017) provide evidence consistent with the interpretation that the SEC enforcement resources deter illegal insider trading. Adhikari, Agrawal, and Sharma (2021) document that a decrease in the risk of lawsuits by shareholders is followed by profitable insider trading. Kacperczyk and Pagnotta (2020) show that insiders trade less aggressively in their own stock when facing higher legal risk. We add to this literature by showing that, in response to insider trading restrictions, insiders substitute informed trading in peer firms for trading in their own stock.

We also further the literature on the effectiveness of insider trading regulation. See Jaffe (1974a), Seyhun (1992), Bhattacharya and Daouk (2002), White (2020), among others. We document that insider trading regulations do not completely prevent insiders from profiting from their superior information; they only prevent them from doing so in their own stock. We also document that in the presence of peer trading, stricter insider trading laws may not produce the desired benefits of improved liquidity and better price informativeness.

Next, we describe the institutional background for our study.

2. Institutional Background

2.1 Insider Trading Regulation in India

The Securities and Exchange Board of India (SEBI) is the securities regulator in India and has the power to make regulations consistent with the objectives of the Securities and

Exchange Act of 1992. The SEBI first addressed insider trading regulation in the (Prohibition of) Insider Trading Regulations of 1992. After a series of minor amendments in 2002, 2003, 2007, 2008, and 2011, it decided to overhaul and update the regulation, and a new regulation, the Prohibition of Insider Trading Regulations, 2015, was drafted to "put in place a framework for prohibition of insider trading in securities and to strengthen the legal framework thereof."[5]

The Companies Act of 2013, which aimed to improve corporate governance in India, delegated the power to prosecute insider trading in listed and to-be-listed companies to the SEBI. The Sodhi Committee, under the chairmanship of former Chief Justice N. K. Sodhi, was set up in 2013 to review the Prohibition of Insider Trading Regulations of 1992. The committee made "a range of recommendations to the legal framework for prohibition of insider trading in India and has focused on making this area of regulation more predictable, precise and clear by suggesting a combination of principles-based regulations." SEBI adopted the new regulation on January 15, 2015.

Some of the key changes made by the 2015 regulation were (i) Requirement that companies designate a compliance officer who reports to the board. The compliance officer is charged with ensuring compliance with insider trading policies and procedures and ensuring adherence to the regulation. This put the burden on the firm and board to ensure compliance with the regulation. (ii) Clarification and expansion of the scope of an insider, defined as a connected person or anyone who could have access to unpublished price sensitive information (UPSI) regardless of the source of information (iii) Introduction of the option of trading plans for insiders who may have continuous access to UPSI (iv) Requirement that every company formulates and publishes on their website a code of conduct for the handling of UPSI and establish a trading window for trading in the company's securities (v) Addition of the provision

[5] A detailed discussion on introduction of the 2015 Regulations is available at: https://xbma.org/indian-update-new-insider-trading-laws-in-india-how-much-is-too-much/ retrieved on October 20, 2020.

that SEBI could take action against any violation of the regulations, simplifying a previously lengthy and ineffective process. Overall, the Prohibition of Insider Trading Regulations, 2015, was designed to address widespread insider trading by requiring greater compliance and monitoring while increasing the burden of proof on the alleged insider.

Thus, the insider trading law was significantly strengthened in 2015, and the onus of enforcement partially shifted to the company, making the restrictions more effective. As noted in the introduction, the financial news media did perceive the new regulation to be stricter and more in line with the global standards. Still, one potential concern is the lack of enforcement of insider trading laws in developing economies and Bhattacharya and Daouk (2009) argue that no insider trading law is better than unenforced laws. While they document several countries with no enforcement despite having insider trading laws, they report that the first insider trading enforcement action in India occurred in 1998. We also verified that there was continued enforcement during our sample period. The SEBI publishes its enforcement actions on insider trading in its annual reports and during our sample period, the number of new investigations initiated ranged from 10 to 34 per year.[6] Insider trading enforcement actions tend to be rare even in developed economies and thus this evidence provides us assurance that there is some degree of enforcement of insider trading in India.

Further, the effectiveness of the law can be gauged by the change in behavior of the insiders. As we document in our tests, the insiders' trades in their own stocks did become less frequent and less informed after the new regulation. This provides additional validity that the change in the regulation did have teeth.

[6] Refer SEBI Annual Reports from 2012 through 2017. https://www.sebi.gov.in/sebiweb/home/HomeAction.do?doListing=yes&sid=4&ssid=80&smid=101 accessed on September 19, 2021.

2.2. Stock Exchanges

India has two major stock exchanges, the Bombay Stock Exchange (BSE), established in 1875, and the National Stock Exchange (NSE), established in 1992. The BSE is the largest securities market in India, with over 5,000 companies listed on it, and the NSE has almost 2,000 stocks listed on it. While BSE has more stocks listed, the volume of shares traded tends to be higher on NSE. Most brokers are members of both the BSE and NSE and thus, for firms listed on both exchanges, investors have the option of trading on either exchange. Insiders are required to disclose insider trades to the stock exchange(s) within 2 trading days, and the exchanges are required to make these filings available on their website. This is the primary source of the insider trading data that we use in our study.

3. Data

Our broad approach to constructing the sample involves matching the reported insider trades to a detailed transaction-level dataset from the BSE. We first describe the reported insider trade data, followed by the BSE trade data, then the sample period, and finally the matching process.

3.1 Insider Trading Data

Existing insider trading regulation mandates that directors, officers, and substantial shareholders in a listed Indian company report the trades that exceed Rs. 500,000 (about $6,700) in value or 25,000 shares or 1% of the total shareholding in the stock of that company to the stock exchange(s). We obtain these filings from the Prowess database by the Centre for Monitoring the Indian Economy (CMIE). The disclosure includes the date of the transaction, the insider's name, stock identifier, mode of acquisition or sale, and the number of shares transacted. The filings can pertain to transactions other than a trade on an exchange such as allotment of shares under employee stock ownership plans, off-market transactions, and

exercise of employee stock options. We only retain the insider-reported trades executed on the secondary market.[7] This results in 68,983 distinct insider-reported transactions – 19,583 purchases and 49,220 sales, corresponding to 12,890 insiders, from the year 2012 through 2017.

3.2 BSE Trade Data

We use a proprietary dataset that covers all the trades that have been executed on the BSE over a period of six years, from 2012 to 2017. The details include the date of the trade, stock identifier, number of shares, trade price, broker identifiers (IDs), and trader (broker's client) IDs for both sides of the transaction (buy and sell). Every broker assigns a unique ID to each of their clients, and thus, we can uniquely identify a trader for all trades executed through a given broker based on the broker ID - client ID pair. The client and the broker IDs are anonymized but stay constant for a given broker and client for the entire period. Thus, to the extent an investor trades through the same broker, we can track her trading activity on the BSE for our sample period. This feature is particularly valuable as it allows us to match insider trades more accurately to a trader, which is not possible using typical publicly available transaction databases that contain no identifiers for the trading parties. For example, Inci, Lu, and Sehyun, 2010, use the TAQ data to match to the reported insider trades.

3.3 Sample Period

We utilize the 2015 Prohibition of Insider Trading Regulation by the Securities and Exchange Board of India (SEBI) to cleanly identify a shock to insider trading regulation. Though the regulation was adopted on January 15, 2015, the Companies Act of 2013 enumerates the provision for insider trading restriction (without providing explicit guidelines

[7] The SEBI mandates that insiders report their own-firm-trades to all the stock exchanges that list the insiders' firms.

for it). Also, following the Companies Act of 2013, the draft rules were published, and public comments were solicited before the law was finally adopted on January 15, 2015. Hence, we view the period between September 12, 2013 (the effective date for the Companies Act) and January 15, 2015 (adoption of the Insider Trading Regulation, 2015) as a transition period with significant regulatory uncertainty, and we eliminate it from the analysis. In summary, the pre-regulation period spans from January 1, 2012, through September 12, 2013, and the post-regulation period spans from January 15, 2015, to December 31, 2017. We conduct robustness tests by examining alternative transition periods and discuss the results in Section 4.5.4.

3.4 Sample Construction

To identify potential insiders in the BSE trade dataset, we begin with the reported insider trades during our sample period. Then, for every reported insider trade, we identify all the traders in the BSE data that have traded in the insiders' own firm on the given date. For each of these traders, we separately aggregate the number of shares bought and the number of shares sold on that date. We aggregate the shares at a daily level for a trader to account for the possibility that a trade may be split during execution, but the insiders report the total number of shares traded.

The idea is to match an insider (who reports trades) uniquely to a trader account in the BSE trade data and be reasonably confident that the account belongs to the insider. The process involves uniquely matching a reported trade to a BSE trade based on the date of the transaction, stock identifier, number of shares transacted, and direction of the trade (acquisition or sale). Such a matching process often results in a single reported insider trade being matched to

multiple trades in the BSE trade dataset. This usually occurs when the insider's trade is a round-lot trade and a popular trade size for many traders on that date.[8]

To enable a unique match between an insider and a BSE trader, we, therefore, focus our attention on insiders with at least two reported trades, with at least one of them being an odd-lot trade during the sample period. This yields a sample of 6,293 insiders, corresponding to 56,486 trades. The matching process is executed in two stages. In the first stage, we only consider the odd-lot trades and try to match them to a trader account in the BSE trade data. At this stage, one of the three possible outcomes may occur for the reported insider trade, (i) the trade matches uniquely to an account, (ii) the trade matches to multiple accounts, or (iii) the trade does not match to any trading account.[9] For outcomes (ii) or (iii), we drop the insider trade from subsequent analysis. In case of a unique match, i.e., outcome (i), we consider the trader account in the BSE data as a potential insider account and this insider-trader account pair is analyzed further in the next stage.[10]

In the second stage, we require that an insider with a "potential insider account" matches uniquely to the same account for at least one more reported trade. In case of a unique match again, we attribute the trader account in the BSE data to the corresponding insider. Overall, the two-stage process ensures that an insider matches uniquely to an account at least

[8] We consider frequently traded transaction volumes as round lots. Specifically, we categorize an insider trade as a round lot trade if the aggregated transaction volume in a day is 150,250, 1500, 2500, 15000 or 25000 or is a multiple of 100 (between 100 to 1000 e.g., 100, 200 etc.) or a multiple of 1000 (between 1000 to 10000 e.g., 1000, 5000 etc.) or a multiple of 10000 (e.g.,10000, 50000, etc.). Non-round lot trades are considered as odd-lot trades.
[9] The insider trades may not match with any account primarily because of two reasons- (i) the insider split the trade across multiple accounts, or (ii) the trade is not executed on the BSE. The second scenario is likely because Prowess dataset provides the name of the exchange on which the insider trade was *reported* but does not specify the exchange on which it was *executed*.
[10] Despite a unique match between insider and BSE account, there is a likelihood that the insider trade was executed on another exchange and happened to match exactly with another trade executed on BSE. To alleviate concerns about inaccurate mapping of the insider and her account we perform additional analysis in the second stage.

twice, and at least one of those unique matches is for an odd-lot trade. This gives us further confidence in the insider- BSE trader account match.

Table 1 reports the descriptive statistics of reported and matched trades. Overall, we match 11,090 reported trades and 1,312 reporting insiders to an account in the BSE data. Once a trader account in the BSE data is mapped to an insider, we extract all trades executed through this account, enabling us to identify trades by insiders in stocks other than their own. Next, we obtain the financial data and stock returns for the own stocks and peer stocks from CMIE's Prowess database. We define peer stocks as stocks in the same industry as the insider's own firm. We evaluate the profitability of the trades using six-month buy-and-hold returns for each own and peer-stock-trade through insider accounts. The trades with missing returns are dropped from the sample. Lastly, we exclude the insiders in the finance industry from the sample. Finance industry insiders are likely to possess broad inter-industry information due to lending relationships. Unlike insiders in other industries, they may use their superior private information to trade more broadly, i.e., in non-peer firms. After these steps, we have 943 insiders with 17,367 total trades- 13,912[11] in their own stocks and 3,455 in peer stocks.[12]

4. Probability and Profitability of Insider Trades

We conduct two broad categories of tests to examine the change in behavior by corporate insiders following the change in regulation: (i) evaluation of the likelihood of an insider trade in own and peer stock and (ii) examination of the profitability of insiders' own

[11] In addition to reported trades for matched insiders, our sample includes the insider trades that may not be reported because these do not qualify the reporting thresholds..

[12] The identification of peer depends on the industry classification. Prowess has a finer classification and a coarser classification, analogous to the 4-digit versus 2-digit SICs. We chose to define peers based on the finer industry classification in Prowess. While we identify fewer peer in the finer classification, these peers are more similar and therefore industry information is more transferable, an important attribute for our setting.

and peer-stock-trades.[13] Further, we investigate the role of access to fungible information in changing the trading behavior of insiders. We describe these tests and results in this section.

4.1 Likelihood of Own- and Peer-Stock-Trades

Are insiders more or less likely to trade in their own firm's stock and peer stocks after the new regulation? We examine this using insider- insiders' own-firm-announcement-quarters as our unit of observation. A firm-announcement-quarter for each firm is measured from the previous earnings announcement date +2 days to the current quarter earnings announcement date +1 day. We examine the likelihood of a trade in own and peer stocks by estimating the following linear probability model.

$$\text{Own-Stock-Trade}_{(1,0)ijt}(\text{Peer-Stock-Trade}_{(1,0)ijt}) = \alpha + \beta_1 \text{Post}_t + \varepsilon_{ijt} \quad (1),$$

where *Own-Stock-Trade* $_{(1,0)ijt}$ (*Peer-Stock-Trade* $_{(1,0)ijt}$) is an indicator variable that equals one if an insider *j* of firm *i* trades in her own stock (a peer stock) during a given earnings announcement quarter *t* of firm *i*, and zero otherwise. $Post_t$ is an indicator variable equal to one during the post-regulation period and zero otherwise. We use either industry or insider fixed effects.[14]

It is important to caveat that (i) our data does not include trades by a given insider that were executed on the National Stock Exchange (NSE) since we only have access to the BSE trades, and (ii) we do not include trades executed on the BSE by a given insider with another

[13] Consistent with Ben-David et al. (2019), we look at both, insider purchases and sales. But prior literature shows that insider purchases of own stock are information driven, more so as compared to insider sales (which could be driven by diversification and liquidity needs of insiders). Diversification and liquidity needs are less likely to drive peer stock sells and therefore we retain both buys and sells. Nevertheless, we perform robustness tests for the likelihood and profitability of insider purchases.

[14] According to Wooldridge (2002), the linear probability model is often a good approximation. The case for it is stronger when the explanatory variables are all indicator variables and the specification has a large number of fixed effects, as is situation here. Wooldridge further notes the problems associated with probit with fixed effects (computational difficulty and inconsistent estimates) and logit with fixed effects (difficulty in estimating partial effects). See discussion in Chapters 15.2, 15.8.2, and 15.8.3 in Wooldridge (2002). Based on these considerations and for ease of interpretation, we use the linear probability model as our estimation method. However, we get similar results using the logit model.

broker if we did not match that broker-client pair to the insider at the matching step. We do not expect these exclusions to bias our results since there is no reason for insiders to systematically change their trading behavior between exchanges and brokers in different ways for their own stocks and peer stocks around the regulation. Therefore, while we do not look at a comprehensive set of insider trades, we study a comparable subset of trades by insiders in the pre- and post-regulation periods. This is similar to the setting in Ben-David, Birru, and Rossi (2019), who examine insiders' trades executed through one large discount broker.

Table 2 presents the results of the estimation of Equation (1). Columns (1) and (2) have specifications with industry fixed effects. We find that β_1 is -0.0372 and significant for the likelihood of insider trades in their own stocks. On the other hand, when we examine the likelihood of insiders' peer-stock trades, β_1 is +0.0091 and significant. This suggests that insiders are less likely to transact in their own stocks but more likely to trade in peer-firm stocks when they face stricter insider trading regulation. The pre-period probability of insider trade in own stock is around 0.17 and in peer stocks is 0.046. Thus, the likelihood of trades by firm insiders in their own stocks (peer stocks) reduces (increases) by about 22% (20%), an economically meaningful magnitude. We find very similar results in direction and magnitude in Columns (3) and (4) which include insider fixed effects. Thus, even after controlling for each insider's propensity to trade, we find that the probability of trading partially shifts from own stocks to peer stocks after the new regulation.

Since the likelihood of a trade in peer stocks depends on the availability of relevant information about peer stocks, we predict that the increase in peer-stock trades will be greater for insiders with the availability of more fungible information from their own stocks. We construct a measure of comovement of insider's own stock's returns with the returns of the remaining firms in the industry by adapting the Piotroski and Roulstone (2004) synchronicity measure. We regress the firm's weekly stock returns on the current and prior week's value-

weighted industry returns (excluding the firm's returns). The firm-specific measure of comovement is defined as the log of the ratio of R-square and (1-R-square) obtained from the regression. We calculate comovement for insiders' own firms during the pre-regulation period and we use this throughout the sample. We assign an indicator variable, *High_Comove*, a value of one if the pre-period comovement of insider's own firm is above the median and zero otherwise.

We add *High_Comove* to Equation (1) and interact it with *Post*. We use only industry fixed effects in this specification, and not insider fixed effects because comovement is measured for an insider's own firm using the pre-regulation period. Given that the majority of the insiders are insiders in only one firm, there is not enough variation in comovement within insiders. For a related trade by an insider with multiple own firms, we pick the highest value of comovement and corresponding *High_Comove* across all own stocks of that insider. These results are in Table 3. When comovement is high, there is a higher likelihood of a peer trade before the regulation (the coefficient on *High_Comove* is 0.03, which is significant at the 1 percent level) and there is a further incremental increase in this likelihood after the regulation. The coefficient of *Post* X *High_Comove* is positive and significant, and so is the sum of coefficients on *Post* and *Post* X *High_Comove*. At the same time, we find no difference in the likelihood of trading in own stock when the own stock comoves more with the industry. Although the coefficient for *Post* X *High_Comove* for Own-Stock-Trade is negative, it is insignificant. Overall, the results are consistent with our prediction that insiders are more likely to trade in peer stocks, particularly when their private information is more fungible.

4.2 Profitability of Own- and Peer-Stock-Trades

To evaluate the profitability of trades executed by insiders in their own stock and peer stocks, we calculate abnormal returns for each trade using the approach in Daniel, Grinblatt,

Titman, and Wermers (1997) (with the modifications specified in Wermers, 2004). Specifically, we construct 125 portfolios by sequentially sorting the universe of the stocks based on quintiles of log market capitalization, book-to-market ratio, and momentum. Next, the overall DGTW-adjusted return for a stock is calculated as the stock's six-month buy-and-hold return less the six-month buy-and-hold return for the value-weighted DGTW portfolio to which the stock belongs.[15] The returns are winsorized at 1st and 99th percentiles.

We first examine the univariate returns for the insider trades in own stock and peer stocks in Table 4. Consistent with Krishnan and Rangan (2015), we find that overall, insiders trade profitably in their own firm stocks during the pre-period. Table 4 has three main insights relevant to our questions. First, the profitability of an average peer-stock trade in the post-period increases by 4.63 percentage points relative to the pre-period. Second, the own-stock trades are significantly more profitable than peer-stock trades in the pre-period, indicating that insiders use their private information to trade in their own stock before the new regulation. Third, though own-stock trades continue to be profitable on average in the post-regulation period, the difference in the profitability of own and peer-stock trades is no longer statistically significant. In summary, the univariate returns comparison provides initial evidence supporting the conjecture that insiders partially substitute their informed trading in own-firm stocks with informed trades in peer stocks following stricter insider trading regulations.

We then examine the overall DGTW-adjusted six-month returns of insider trades in a regression and compare the profitability of trades in peer versus own stocks in the pre- versus post-regulation periods using the following specification.

$$\text{Overall DGTW-Adj Returns}_{ijt} = \alpha + \beta_1 \text{Own\_Stock}_{ij} + \beta_2 \text{Post}_t + \beta_3 \text{Post}_t \text{ X Own\_Stock}_{ij} + \varepsilon_{ijt} \quad (2),$$

[15] We examine the profitability over a horizon of six months because contra-trading by insiders in their own firm is restricted within a span of at least six months. Nevertheless, we also examine an alternative returns horizon in the robustness tests.

where *Overall DGTW-Adj Returns*$_{ijt}$ is the abnormal buy-and-hold return over six months for a trade executed by insider *j* in stock *i* on date *t*. *Own_Stock*$_{ij}$ is an indicator variable equal to one if stock *i* is insider *j*'s own firm, and zero otherwise. *Post*$_t$ is an indicator variable equal to one during the post-regulation period and zero otherwise. We include industry or insider fixed effects, and the standard errors are clustered at the traded stock-trading date level. The profitability of peer trades in the pre-period is subsumed in the intercept. β_1 captures the incremental profitability for trades in own-stocks relative to peer-stock trades in the pre-regulation period. β_2 captures the incremental profitability on peer-stock trades in the post-regulation period relative to the pre-period. Our conjecture is that if insiders channel their private information towards peer-stock trades to avoid scrutiny, then β_2 should be positive and significant. β_3 captures the incremental effect of the regulation on own stocks relative to peer stocks.

We present the results in Table 5. We find that β_1 is positive and significant at the one percent level, suggesting that in the pre-regulation period, insiders earned significantly higher returns on their trades in their own stocks relative to trades in peer stocks, even with industry or insider fixed effects. The coefficient of *Post* is in the range of 2.8% - 4.2% return over a six-month period, which is considerable. It is also a sizeable improvement given that the pre-period profitability of peer stocks is -2.6% (Table 4). Thus, consistent with our prediction, the profitability for peer stocks increases after the regulation. On the other hand, the coefficient for *Post* X *Own_Stock* is negative and significant implying that relative to peer stocks, there is a decrease in profitability of own-stock trades in the post-period. The overall profitability of own-stock trades (β_2+ β_3) does not go down after the regulation when we have industry fixed effects. But it does go down significantly once we control for insiders' skill and information processing ability via insider fixed effects.

To examine the role of availability of fungible information, we conjecture that the insider's private information about her own firm is more value-relevant for trading in peer firms when their own stock comoves more with the industry. We include the indicator for high comovement, *High_Comove*, and interact it with each of our variables in Equation (2). The results are reported in Table 6. The coefficient on *Post* captures the increase in profitability for peer-stock trades by insiders with less fungible information. It is positive but insignificant. However, the change in profitability for peer-stock trades by insiders with more fungible information is captured by the sum of coefficients on *Post* and *Post* X *High_Comove*. The F-test for the sum of coefficients is significant at the one percent level, as predicted. This, combined with the evidence in Table 3 that insiders are more likely to trade in peer stocks when their own stock has high comovement with the industry, points to the availability of additional profit-making opportunities for the insiders when the own-firm information is fungible.

4.3. Trades using common industry information

To provide further support for the hypothesis that insiders use fungible information to trade profitably in peer stocks, we first focus on a coarse measure of information fungibility-common industry information. Specifically, we examine the changes in profitability around the regulation coming from industry and firm-specific components of returns. If the increase in peer stock trades after the regulation is driven by fungible information such as common industry information, we expect the increase in profitability of peer trades to be driven by the industry component of returns. To the extent that insiders are experts in the industry and can assess the differential impact of industry news on individual firms within the industry, we expect the profitability of such trades to be driven by firm-specific returns. Such trades would have been attractive before the regulation and the regulation should not have had any effect on these trades.

Industry Ret, the industry component of abnormal returns for a given insider trade, is computed as the value-weighted DGTW-adjusted returns for all stocks in a given industry for the six-month period starting on the date of a given insider's trade. *Firm-specific Ret*, therefore, is the firm's overall DGTW-adjusted return less *Industry Ret*. We run the specification in Equation (2) with these separate components as dependent variables with either industry or insider fixed effects. The results are reported in Table 7. Columns (1) and (3) report the results for *Industry Ret* and Columns (2) and (4) for *Firm-specific Ret*. For peer-stock trades, there is a significant increase in the industry component of the returns, but not firm-specific returns as seen from the coefficient for *Post*. These results are consistent with insiders using common industry information to trade in peer stocks after the regulation. As an alternative strategy, insiders could exchange non-public own-firm-specific information with peer-firm managers, who could then use it to trade profitably in peer stocks. Such cross-tipping-based trading strategies would result in higher peer-firm-specific returns. We find no support for change in this alternative information channel as evident from the insignificant coefficient for *Post* in Column (2) and Column (4).

There is a significant reduction in the firm-specific component in own stock returns across both specifications. β_3, as well as $\beta_2 + \beta_3$, are negative and significant at the 1% percent level, indicating that insiders reduce the use of firm-specific information while trading in their own stock. This is consistent with the objectives of the insider trading law. Interestingly, however, the industry component of returns of own trades increases after the regulation with both β_3 and $\beta_2 + \beta_3$ positive and significant. These results suggest that after the new regulations, insiders alter the type of information they use for their trades, relying more on the industry component of their information and scaling back on using the firm-specific news even while trading in their own stocks.

Overall, the results in Tables 3, 6, and 7 suggest that information fungibility owing to common industry information contributes to insiders trading profitably in peer stocks after the regulation.

4.4. Trades in correlated peer-stocks

Next, we examine if information fungibility between the own firm and a given peer firm contributes to insiders' profitability in the peer stock. After the new regulations, if the insiders use information about their own stock to trade profitably in peer stocks, we expect the profitability to be higher for peer stocks that are highly correlated with the insider's own stock. To examine this possibility, we calculate a pairwise correlation between each insider's own stock and a peer stock. Then we run the following specification for all the related-stock-trades:

$$\text{Overall DGTW-Adj Returns}_{ijt} = \alpha + \beta_1 \text{ High\_Pairwise\_Corr}_{ij} + \beta_2 \text{ Post}_t + \beta_3 \text{ Post}_t \text{ X High\_Pairwise\_Corr}_{ij} + \varepsilon_{ijt} \quad (3),$$

where *High_Pairwise_Corr*$_{ij}$ is an indicator variable equal to one if the pairwise correlation, in the pre-regulation period, between the weekly returns of own stock of insider *j* and peer stock *i* is above the median pairwise correlation, and zero otherwise.[16] For a related trade by an insider with multiple own firms, we pick the highest value of pairwise correlation and corresponding *High_Pairwise_Corr* across all own stocks of that insider. Other variables are as defined earlier and summarized in Appendix A. The results for Equation (3) are in Column (1) of Table 8. As expected, we find that the improvement in profitability of related trades is driven by peer stocks that are highly correlated with insider's own stock. β_3, as well as $\beta 2 + \beta 3$, are positive and significant at 1%. This finding demonstrates that insiders use the fungible information from their own firm to profitably trade in a given peer firm.

[16] We use the pre-period pairwise correlation and not a time-varying measure of correlation because changes in the insider trading behavior may alter the pairwise correlation between own stock and peer stock in the post regulation period.

Our argument that insiders at least partly substitute informed trading in their own stock with that in peer stocks in response to stricter insider trading regulations implicitly assumes that, in the absence of regulation, insiders' dominant strategy for profit maximization is to trade in their own stocks using their precise information. To support this argument, for each peer-firm trade by insiders, we calculate "pseudo" return as the return of a hypothetical trade in insider's own stock on the same date and in the same direction (buy/sell) as the peer-firm trade. We estimate the following regression:

$$\text{Pseudo Own-Stock Ret}_{ijt} = \alpha + \beta_1 \text{High\_Pairwise\_Corr}_{ij} + \beta_2 \text{Post}_t + \beta_3 \text{Post}_t \text{ X High\_Pairwise\_Corr}_{ij} + \varepsilon_{ijt} \quad (4),$$

where *Pseudo Own-Stock Ret*$_{ijt}$ is the six-month buy-and-hold DGTW- adjusted returns for a hypothetical trade by insider *j* in their own-stock on date *t* that is identical to their *actual* trade in peer stock *i* on the same date. The other variables are as defined before and summarized in Appendix A. The results are reported in Column (2) of Table 8.[17] We expect that the insiders' *hypothetical* trade in their own stock is profitable when the own stock and the peer stock are highly correlated. Consistent with this prediction, the coefficient for *Post* X *High_Pairwise_Corr* and the sum of coefficients of *Post* and *Post* X *High_Pairwise_Corr* are positive and significant. Comparing the magnitude of coefficients β_3 as well as $\beta_2 + \beta_3$ across Columns (1) and (2), we see that the bulk of the improvement in profitability of highly correlated stocks is explained by pseudo-own-stock return, the profitability of the foregone own-stock-trade.

[17] The number of peer-trade observations in Table 8 are lesser as compared to those in Table 4 because of missing value for pseudo-own stock returns and pairwise correlation.

We also examine if information about the related stock itself plays a role in the profitability of the related stock trades. To dig deeper into this phenomenon, we run the following specification:

$$\text{Remainder Peer-Stock Ret}_{ijt} = \alpha + \beta_1 \text{ High\_Pairwise\_Corr}_{ij} + \beta_2 \text{ Post}_t + \beta_3 \text{ Post}_t \text{ X High\_Pairwise\_Corr}_{ij} + \varepsilon_{ijt} \quad (5),$$

where *Remainder Peer-Stock Ret*$_{ijkt}$ is the difference between actual six-month buy-and-hold DGTW-adjusted return of the trade in peer stock *i* by insider *j* and *Pseudo Own-Stock Ret*$_{ijt}$. The other variables are as defined before and summarized in Appendix A. We present these results in Column (3) of Table 8. This related-stock-specific component does not provide any significant contribution to the increased profitability of the peer-stock trades post-regulation. The evidence in Column (3) supports the interpretation that peer insiders are trading on information about their own firm and not on the information leaked by insiders of the traded firm.

Next, we investigate if the increased pseudo-own stock returns of highly correlated peer stocks are driven by the industry component or the own-firm-specific idiosyncratic component. We use *Industry Ret* and *Industry Adjusted Pseudo Own-Stock Ret*$_{ijt}$ (difference between *Pseudo Own-Stock Ret*$_{ijt}$ and *Industry Ret*$_{ijt}$) as the dependent variables in Eq (4). The results are in Table 8 in Columns (4) and (5), respectively. We find that *Industry Ret* does not show any incremental improvement for highly correlated peer stocks, as seen from the insignificant coefficient of *Post* X *High_Pairwise_Corr*. In contrast, we find a positive and significant coefficient for *Post* X *High_Pairwise_Corr* for *Industry Adjusted Pseudo Own-Stock Ret*. Overall, these two results further strengthen the argument that insiders use own-firm specific information, and not industry information, to trade profitably in highly correlated peer stocks.

Taken together, the evidence in Table 8 supports the argument that when faced with stricter insider laws, insiders switch the use of their information about their firm from profitable trading in their own stock to profitable trading in peer stocks. In the absence of restriction, they could have profitably traded in their own stock.

It is important to highlight one assumption underlying the analysis in this subsection. While calculating the pseudo-own-stock returns, we have assumed that the best hypothetical trade in the own stock, in the absence of stricter regulation, would have been one identical to the trade in the peer stock. But if the insiders were to take advantage of their information by trading their own stock, they might have structured their trade differently to make the best use of their information in that situation. Thus, the pseudo return we calculate provides a lower bound on the profitability of the trade foregone in own stock. Based on this lower bound, our evidence suggests that the foregone trades in own stocks would have been no less and potentially more profitable than the actual trades in peer stocks. Thus, the evidence supports the argument that that faced with stricter insider trading law, insiders switch from trading in their own stock to trading in peer stocks *using the information about their own stock*.

4.5 Robustness Tests

4.5.1. Trading around earnings announcements

Is insiders' change in trading behavior in response to the change in the regulation particularly salient before earnings announcements? Mehta et al. (2021) find increased levels of informed trading in connected firms before a firm's earnings announcement. Thus, given the evidence in Section 4.4, it is possible that insiders use earnings-related information about their own firms to trade in peer-firm stocks. On the other hand, information overlap between own and peer firms could allow them to trade more profitably in peer stocks all through the quarter. To examine this possibility, we split an earnings announcement quarter of each

insider's own firm into two periods, (i) a high earnings-information period: t-10 days to t+1 days around the earnings announcement t, and (ii) low earnings-information period: the remaining days in the earnings announcement quarter. We reexamine the profitability of trades using Equation (2) separately for these two periods. The results in Table A.1 in the Online Appendix show that the insider trades in peer stocks improve in profitability after the regulation in both periods, but the magnitude is larger in the high earnings-information period. Thus, while insiders' information advantage in the peer stocks is stronger for earnings-related information, it is not limited to that type of information.

4.5.2 Trading in non-peer stocks

So far, we have established that following more stringent insider trading regulations, insiders trade more profitably in peer stocks. But are these results specific to peer stocks or to *all* stocks other than insider's own stock? To examine this possibility, we extract all the trades by the matched insiders in the stocks other than their own and peer stocks, which we refer to as non-peer stocks. There are 88,078 such trades in our sample, making the total number of trades (own + peer + non-peer) 105,445. We investigate if insiders make abnormal returns in their non-peer-stock-trades by running the following specification similar to Equation (2) using all trades by insiders:

$$\text{Overall DGTW-Adj Returns}_{ijt} = \alpha + \beta_1 \text{ Own\_Stock}_j + \beta_2 \text{ Post}_t + \beta_3 \text{ Post}_t \text{ X Own\_Stock}_j + \beta_4 \text{ Peer\_Stock}_j + \beta_5 \text{ Post}_t \text{ X Peer\_Stock}_j + \varepsilon_{ijt} \quad (6),$$

where Overall DGTW-Adj Returns$_{ijt}$ is the abnormal buy-and-hold return over six months for a trade executed by insider j in stock i on date t. All other variables are as defined before and summarized in Appendix A. The pre-period profitability of non-peer stocks is subsumed by the intercept. β_1 and β_4 capture the incremental profitability of own and peer stocks, respectively, relative to the non-peer stocks in the pre-period. Table A.2 in the Online Appendix shows the results. Coefficient β_2 is positive and statistically significant, indicating

that the profitability of non-peer stock does go up after the regulation. But coefficient β_5 shows that, relative to non-peer stocks, there is an incremental and statistically significant increase of about 4 percentage points in the profitability of peer stocks.

Further, we decompose the profitability into the industry and firm-specific components in Table A.3 in the Online Appendix. We see that the increase in profitability of non-peer trades is coming exclusively from firm-specific component – around 50 to 60 basis points – as indicated by the coefficient for *Post* in Columns (2) and (4). On the other hand, the rise in profitability of peer stocks (*Post* + *Post* X *Peer_Stock* in Columns (1) and (3)) is coming solely from the industry component. It is also around 250 to 300 basis points, which is 5 times as large as the effect for non-peer stocks. Thus, the insider may have some private information about some non-peer firms, which is unrelated to the industry component. But their informational advantage in non-peer stocks is much smaller compared to the one in peer stocks. Similar to the results in Table 7, we find that the industry component of returns from own-stock trades goes up while the firm-specific component goes down.[18] Taken together these results bolster our earlier conclusions that, after the regulations, (i) insiders reduce the use of firm-specific private information for trading in their own stock; and (ii) they move to using common industry information for trading in their own and peer stocks.

4.5.3. Governance as an alternative explanation

Around the period of the insider trading regulation, the Companies Act of 2013 required all firms to have independent, diverse boards. An alternative explanation for our results is that the improved corporate governance, due to better board monitoring, restricted insider trading (Dai et al., 2016; Ravina and Sapienza 2010, Cziraki et al., 2014, Jagolinzer et

[18] Prior to the change in regulation, the industry component of returns is lower for peer stocks compared to non-peer stocks, consistent with the insiders' need for hedging their own industry risk but not that of non-peer stocks.

al. 2011). To examine any possible confounding effects of governance changes, we re-estimate Equation (2) in a sample of firms that had strong boards, proxied by board independence, throughout the sample period. This sample includes 53 insiders with 899 trades, and the results are reported in Table A.4 in the Online Appendix. Similar to the results in Tables 5 and 7, there is a significant increase in peer-stock-trade profitability and a reduction in profitability of insider trades in own stock. Further, like the whole sample, the industry component of profitability increases for peer-stock-trades (coefficient for *Post*), as well as own-stock-trades (Post + Post X Own_Stock) and the reduction in own stock profitability is driven by the firm-specific component of returns. Despite the small sample, these results are largely consistent with the results in the whole sample. Therefore, we are reassured that the results are not entirely driven by concurrent changes in governance-related regulations and can be interpreted as a consequence of the insider trading regulation.

4.5.4 Alternative transition windows delineating the pre- and post-regulation periods

To address concerns about the sensitivity of our results to the transition window, we re-examine the probability and profitability of insider trades using two alternative transition windows. First, we examine the effects using an extended transition window i.e., we consider the sample period between the effective date of the Companies Act of 2013 (September 12, 2013) and the effective date of the Prohibition of Insider Trading Regulation (May 15, 2015) as the transition window. Specifically, the period after May 15, 2015, is considered as the post-regulation period, and the period before September 12, 2013, is considered as the pre-regulation period. Second, we do not use a transition window i.e., the period after January 15, 2015, is considered as the post-regulation period, and the period before January 15, 2015, is considered as the pre-regulation period. We evaluate Equation (1) and Equation (2) with the two alternative definitions for *Post*. Our results are robust to these alternative transition windows and are presented in Table A.5 and Table A.6 in the Online Appendix. As in Table 2, we find in Table

A.5 that after the regulation, the likelihood of own-stock-trade goes down and that of peer-stock-trade goes up. Further, the profitability results in Table A.6 are similar to those in Table 7. Thus, it is a robust inference that, in the face of stricter insider trading regulation, insiders partially move their informed trades from their own stock to peer stocks.

4.5.5 Alternative return horizons

The profitability tests presented earlier evaluate the profitability of insiders' trades over a horizon of six months. To address potential concerns about the sensitivity of our results to this holding period horizon, we evaluate Equation (2) with abnormal buy-and-hold return and its industry and firm-specific components over 3 months as the dependent variable. The results presented in Table A.7 in the Online Appendix are similar to those in Tables 5 and 7 that after the regulation a) profitability of own-stock trades goes down, particularly driven by the firm-specific component and b) the overall profitability and the industry component of the peer-stock-trades goes up.

4.5.6 Insider purchases

Insiders trade in their own firms for various reasons, including benefiting from their information advantage, diversification, and liquidity needs. But prior literature documents that primarily it is insider buys that are information-driven (Lakonishok and Lee, 2001; Piotroski and Roulstone, 2005; Veenman, 2012), whereas insider sales are driven by various reasons such as information (Ke, Huddart, and Petroni, 2003), diversification of stock acquired through compensation (Kallunki, Nilsson, and Hellström, 2009), and liquidity needs. Hence, to study information-driven own trades, it is ideal to limit the analysis to insider buys, as it may be challenging to disentangle all the other motives to sell own stocks from information-driven insider sales.

But these arguments about the asymmetric informativeness of buys versus sells cannot be directly extended to peer trades for a couple of reasons. First, unlike the case of own stock that is granted in the form of compensation, insiders do not acquire peer stock in the normal course of business, dampening the diversification and liquidity motives for selling peer stock. Second, the fungible information that insiders possess could be good or bad, resulting in a buy or a sell. Thus, both buys and sells of peer stock are expected to be driven by information. However, due to short-sale constraints sales are restricted to cases with prior ownership of the peer stock. Purchases in peer stocks are not limited by such constraints. So, as a robustness test and for comparability with studies that focus on insider purchases (see Veenman, 2012), we restrict our sample to own-stock purchases and peer-stock purchases.

The results of Equation (1) and Equation (2) for purchases are reported in the Online Appendix in Table A.8. As reported in Panel A, the likelihood of own-stock purchases significantly reduces after the strengthening of insider trading regulation. The likelihood of peer-stock purchases increases, although it is marginally insignificant. Further, Panel B shows that the profitability of peer-stock-purchases significantly increases in the post-regulation.

5. Price Informativeness and Liquidity

The results so far demonstrate that owing to stricter insider trading regulations, insiders' trading in their own decreases and informed trading in peer stock increases. Thus, for any given firm, the mix of informed traders changes. Hence, we next examine how this change in the composition of informed traders in a focal firm (due to the regulation change) affects the liquidity and price informativeness of the firm. Table 9 summarizes the characteristics of the firms with at least one matched insider.

5.1 Changes in Stock Liquidity

First, we evaluate whether the liquidity of stocks during the announcement quarter changes after the regulation. There are two opposite forces on illiquidity that arise because of the regulation. On the one hand, a reduction in informed trading by insiders in their own stock should, on average, reduce the illiquidity because of lower adverse selection. At the same time, since insiders of peer stocks trade profitably in each other's stocks, the regulation has encouraged the growth of a new class of informed traders in markets, who could exacerbate the adverse selection. The observed changes in illiquidity around the regulation, therefore, reflect the net effect of these two forces.

We expect the liquidity benefits of reduced insider trading to be dampened for the sub-sample of firms that experience higher cross-trading by peer-firm managers. We compare the average daily illiquidity in high- and low- comovement stocks in the pre- versus post-regulation periods using the following specification:

$$\text{Average Daily Illiquidity}_{it} = \alpha + \beta_1 \text{Post}_t + \beta_2 \text{Post}_t \text{ X High\_Comove}_i + \beta_3 \text{High\_Comove}_i + \text{Controls}_{it} + \varepsilon_{ijt} \quad (8),$$

where *Average Daily Illiquidity*$_{it}$ is the average of the daily illiquidity measures for firm i during an announcement quarter t, defined as the lag earnings announcement date +2 through current quarter earnings announcement date -1. We measure daily stock illiquidity using Illiq (Amihud 2002), defined as the ratio of absolute daily returns and the product of closing price and the number of shares traded. This measure proxies the price impact of trade and does well in capturing the actual price impact (Hasbrouck 2009, Goyenko, Holden, and Trzcinka 2009), even in international markets (Fong, Holden, and Trzcinka 2017). The price impact of trade combines price and quantity dimensions of illiquidity as opposed to the bid-ask spread, which ignores how large or small quantity is available to trade at the best bid and the best ask. We assign an indicator variable, *High_Comove*$_i$, equal to one if the pre-period

comovement of insider's own firm is above the median, and zero otherwise. $Post_t$ is an indicator variable equal to one during the post-regulation period and zero otherwise. We control for firm size, book-to-market ratio, the total institutional ownership, and total insiders' ownership measured at the end of the previous quarter. Additionally, we include volatility, measured as the standard deviation of market-adjusted daily returns over the earnings announcement quarter and industry or firm fixed effects.

β_1 captures the net effect of regulation on illiquidity for stocks with low- comovement. β_2 is the incremental change for stocks with high- comovement. We expect that when stocks do not comove much with the industry, the reduction in insider trading will dominate the net effect because peer-firm insiders may not have tradeable information on the stock. Thus, we expect a reduction in illiquidity for low- comovement stocks. In contrast, since we show greater cross-firm trading by peer-firm insiders when comovement is high, we expect that the adverse selection caused by such informed peer trades will dampen the liquidity benefits of insider trading regulations.

We estimate Equation (8) for matched insider firms and report the results in Table 10. As expected, the coefficient on *Post* is negative and significant. The magnitude of 0.051-0.053, at 81%-84% of the average illiquidity, is substantial. Further, the coefficient for *Post* X *High_Comove* is positive and significant. Thus, in line with our expectations, for the stocks with high comovement, the adverse selection due to increased informed trading by peer-insiders dampens the improvement in liquidity. The sum of the coefficients for *Post* and *Post* X *High_Comove* is statistically insignificant. Hence, after the change in regulation, there is no improvement in liquidity for the high comovement sample. It is important to note that when insiders are restricted from trading in their own stock, there will be an increase in informed trading by non-insiders, not just peer firm managers, because they don't have to worry about competing with insiders. This can also contribute to illiquidity. However, the evidence that our

illiquidity result is driven by firms with high comovement suggests that a big part of the effect is due to cross-trading by peer firm insiders.

5.2 Changes in Stock Price Informativeness

Next, we examine the effect of insider trading regulation on the price informativeness of stocks. Even without considering peer trading, the implications for insider trading regulation on price informativeness are ambiguous. Since insiders trade on value-relevant information about their own firms, they help make prices more informative as this information gets impounded in prices. Thus, curbing insider trading is likely to make prices less informative (Manne, 1966; Carlton and Fischel, 1983; Udpa, 1996; Choi, Faurel, and Hillegeist, 2021). On the other hand, insider trading can discourage information acquisition by outsiders (Fishman and Haggerty, 1992; Bushman, Piotroski, and Smith, 2005). In such a case, restricting insider trading will improve price informativeness. The overall effect on price informativeness depends on which of the two channels dominates. Indeed, Fernandes and Ferreira (2009) find that insider trading laws improve price informativeness in developed markets but not in emerging markets.

Our results so far mean that the insider trading regulations do not unequivocally curb informed trading but lead to a change in the composition of informed traders and their use of information. For both the channels described above, we expect the effect on price informativeness of increased peer trading to offset the effect of reduced trading by own insiders. The extent of this countervailing impact will depend on three factors; a) the information of peer-firm insiders is likely to be noisier than that of own-firm insiders.; b) while insiders are required to report trades in their own stock, peer-firm insiders are not required to report their trades; c) with more informed traders (peer insiders) competing against each other,

the information would get reflected in prices faster, improving the price informativeness (Holden and Subrahmanyam, 1992).

Using the approach in Kacperczyk, Sundaresan, and Wang (2021), we study price informativeness by examining how well prices predict future earnings based on the following specification:[19]

$$EBIT/A_{it} = \alpha + \beta_1 \log(M/A)_{it} \text{ X } Post_{it} + \beta_2 \log(M/A)_{it} \text{ X } Post_{it} \text{ X } High\_Comove_{it} + \beta_3 Post_{it} + \beta_4 \log(M/A)_{it} + \beta_5 Post_{it} \text{ X } High\_Comove_{it} + \beta_6 \log(M/A)_{it} \text{ X } High\_Comove_{it} + \beta_7 High\_Comove_{it} + \beta_8 EBIT/A_{it-4} + Controls_{it} + Controls_{it} \text{ X } \log(M/A)_{it} + \varepsilon_{ijt} \quad (7)$$

The observations are for firm i for the earnings announcement quarter t. $EBIT_{it}$ is the sum of Earnings Before Interest and Tax for firm i for quarters t to t+3. $EBIT/A_{it}$ is EBITit scaled by total assets for the quarter t-1. $\log(M/A)_{it}$ is the log of market capitalization two days before the earnings announcement for quarter t divided by the total assets for quarter t-1. We take the sum of EBIT for four quarters to smoothen the seasonality. Price informativeness is captured by how well log(M/A) predicts $EBIT/A_{it}$. log(M/A) incorporates all the information up to two days before the earnings announcement. A positive β_1 will mean that after the regulation log(M/A) is a better predictor of EBIT/A, thus indicating an improvement in price informativeness. β_2 captures the incremental change in price informativeness of high comovement firms. As we discussed at the beginning of this subsection, while the expected sign of β_1 is ambiguous, we hypothesize β_2 to be of the opposite sign as β_1. Following Kacperczyk, Sundaresan, and Wang (2021), we control for log(Sales), log(Assets), Leverage, Cash Ratio, Tangibility, Institutional Ownership Fraction, Insiders' Ownership Fraction, and interaction of these variables with log(M/A). The control variables are for quarter t-1. The detailed definitions are in Appendix A. We also include industry or firm fixed effects and cluster the standard errors by quarter.

[19] This approach is similar to the measure used by Bai, Philippon, and Savov (2016).

Table 11 presents the results for Specification (7). We see that the coefficient β_1 for log(M/A) X Post is positive and significant. Thus, for low comovement firms, there is an improvement in price informativeness following the new regulation. As expected, the coefficient for log(M/A) X Post X High_Comove is of the opposite sign as the coefficient for log(M/A) X Post, implying a smaller improvement in price informativeness for high comovement firms. In fact, the sum of the two coefficients is insignificant. Thus, for high comovement firms, prices do not become more informative after a stricter insider trading regulation.

We use three other measures of price informativeness also from Kacperczyk, Sundaresan, and Wang (2021): Price Non-sync (Roll, 1988), Jump Ratio (Weller, 2017), and Var Ratio Adj (Lo and McKinlay, 1988).

Price Non-sync is measured as $1 - R^2$ from a regression of weekly stock returns on weekly index returns in an earnings announcement quarter. It is similar to firm-specific return variation used by Fernandes and Ferreira (2009) to measure price informativeness. A higher value of Price Non-sync means greater price variation due to firm-specific news, which is associated with more informativeness prices. We require more than 10 observations to calculate Price Non-sync.

Jump Ratio is the ratio of Earnings Announcement CAR to Total Quarter CAR. The former is calculated as cumulative abnormal return during the 3-day earnings announcement window (Days -1, 0, 1 with Day 0 being the announcement day). Total Quarter CAR is the abnormal return for the entire earnings announcement quarter, including the announcement window. Abnormal return, in this case, is calculated as the market-adjusted return. Jump Ratio captures the share of information released during the earnings announcement. Higher values of the measure imply that more information is released during the earnings announcement

window and hence prices during the rest of the quarter are *less* informative. As Weller (2017) notes, while theoretically Jump Ratio lies between 0 and 1 (for example, Kyle, 1985), empirically realized Jump Ratio can fall outside these bounds. We follow his approach in taming the Jump Ratio by dropping observations with small values of the Jump Ratio denominator relative to the standard deviation of returns. Specifically, use only cases where the ratio of Total Quarter CAR to standard deviation of market-adjusted daily returns is above the sample median.

For the third measure, we first define VR(1,5) as the ratio of the variance of 5-day returns/5 to the variance of 1-day returns (Lo and McKinlay, 1988). We require more than 10 observations of 5-day returns within an earnings announcement quarter. If prices follow a random walk, VR(1,5) equals 1. Var Ratio Adj, defined as |1-VR(1,5)|, captures deviation from a random walk. Hence, the higher value of this variable implies less informative prices.

Using each of these three alternative measures of price informativeness (PI), we run the following regression:

$$PI_{it} = \alpha + \beta_1 Post_{it} + \beta_2 Post_{it} \text{ X } High\_Comove_{it} + \beta_3 EBIT/A_{it-4} + Controls_{it} + \varepsilon_{ijt} \quad (8)$$

We use the same controls as in Specification (7), with firm fixed effects and standard errors clustered by quarter. An improvement in price informativeness for low comovement firms would imply a positive β_1 for Price Non-sync and negative β_1 for Jump Ratio and Var Ratio Adj. As before, we expect β_2 to have a sign opposite to that of β_1. The results are presented in Table 12. The conclusions using Var Ratio Adj are similar to those in Table 11. Prices become more informative after the regulation for low comovement firms but the effect is dampened for in case of high comovement. Here, we see an overall improvement in price informativeness for high comovement firms (sum of coefficients for Post and Post X High_Comove) but to a lesser extent than for low comovement firms. We do not find any

significant change in price informativeness for high or low comovement firms using Price Non-sync and Jump Ratio.

Fernandes and Ferreira (2009) find no improvement in price informativeness in emerging markets following the first-time implementation of insider trading regulation, which happened in India in 1992. We find some evidence that prices become more informative following the 2015 regulation for firms with low comovement. There could be a few possible reasons for these apparently different results. First, the 2015 regulation was designed to be more effective than the original 1992 regulation, as we discussed in Section 2.1. Second, Indian financial markets were more developed in the 2010s compared to the 1990s, making them more similar to the developed markets than earlier (for example, see Krishan, 2011, for an overview of the evolution of Indian financial markets in the 1990s and 2000s).

Taken together, the results in Tables 10-12 suggest that when insiders divert their superior information to trade profitably in peer stocks, both the benefits of improved liquidity and greater price informativeness are attenuated. Overall, the increase in peer-firm trading appears to dampen the intended benefits of the insider trading regulation.

6. Conclusion

We construct a novel dataset of trades on the Bombay Stock Exchange (BSE) by insiders in their own and peer stocks to examine whether stricter insider trading regulations cause insiders to divert the use of their superior private information from profitable trades in their own stock to profitable trades in peer stocks. Insiders face a tradeoff between trading on the more precise information that they have regarding their own stock and the potential legal non-compliance risks. Changes in regulation that increase the costs of non-compliance alter the cost-benefit tradeoff, and thus insiders are less likely to use their private information to trade in their own stock. However, that does not mean that they cannot still profit from their

information. To the extent that their private information is partly fungible to peer stocks, insiders will have greater incentives to use their information and trade profitably in peer stocks following stricter insider trading regulation. This has implications for insider trading regulations, and these effects have been largely ignored in the prior literature.

We find that, when faced with stricter insider trading regulations in India, insiders trade more often and more profitably in peer-firm stocks, especially when insiders are more likely to have fungible information. At the same time, insiders trade less often and less profitably in their own stocks. Thus, there appears to be a partial shift in insider trading behavior away from own stock and towards peer stock in response to insider trading regulation. Further, the analysis of hypothetical trades in own stock suggests that the foregone trades in own stocks would have been no less and potentially more profitable than the actual trades in peer stocks, which further strengthens the substitution argument.

Increased cross-trading by peer-firm managers offset the benefits – increased liquidity and improved price efficiency – of reduced trading by insiders in their own firms. Taken together, our findings suggest that stricter insider trading regulation creates a new category of informed traders, i.e., peer-firm managers. These unintended consequences of more stringent insider regulation might impede the regulators' objective of maintaining fair financial markets.

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APPENDIX A: Description of Variables

Variable	Description
Announcement Quarter / Earnings Announcement Quarter	Lagged earnings announcement date +2 through current quarter earnings announcement date -1.
Dependent Variables	
Average Daily Illiquidity	Daily stock illiquidity, evaluated as the absolute daily returns divided by the product of closing price and the number of shares traded (following Amihud, 2002), averaged over an announcement quarter defined as This is multiplied by a factor of 100.
EBIT/A	$EBIT/A_{it}$ is EBITit scaled by total assets for the quarter t-1. $EBIT_{it}$ is the sum of Earnings Before Interest and Tax for firm i for quarters t to t+3.
Firm-specific Ret	Difference between Overall DGTW-Adj Ret and Industry Ret.
Industry Adjusted Pseudo Own-Stock Ret	Difference between Pseudo Own-Stock Ret and Industry Ret.
Industry Ret	Value weighted average of overall DGTW-Adj Ret of stocks within an industry.
Jump Ratio	Ratio of Earnings Announcement CAR to Total Quarter CAR. Earnings Announcement CAR is the 3-day earnings announcement Cumulative. Abnormal Return (CAR) which is evaluated as the compounded excess return over BSE100 index return over -1 to +1 days around the earnings announcement. Total Quarter CAR is the excess return over the BSE100 index for the entire announcement quarter including the announcement window.
Overall DGTW-Adj Ret	Six-month abnormal buy-and-hold return evaluated based on the approach in Daniel, Grinblatt, Titman, and Wermers (1997) along with the modifications specified in Wermers (2004). The abnormal returns are calculated as the six-month buy-and-hold returns of the stock minus the six-month buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market, and momentum.
Own-Stock-Purchase $_{(1,0)}$	Indicator variable equal to one when an insider has net-buy in own stock during her own firm's announcement quarter, and zero otherwise.
Own-Stock-Trade $_{(1,0)}$	Indicator variable equal to one when an insider trades in her own stock during her own firm's announcement quarter and the transaction value is non-zero, and zero otherwise.
Peer-Stock-Purchase $_{(1,0)}$	Indicator variable equal to one when an insider has net-buy in peer stock during her own firm's announcement quarter, and zero otherwise.

Variable	Description
Peer-Stock-Trade (1,0)	Indicator variable equal to one when an insider trades in peer stock during her own firm's announcement quarter and the transaction value is non-zero, and zero otherwise.
Price Non-sync	$1 - R^2$ from a regression of weekly stock returns on weekly index returns in an announcement quarter. We require more than 10 observations in a quarter for calculation.
Pseudo Own-Stock Ret	Abnormal return of a hypothetical own-stock trade on the day of an actual peer-stock trade by an insider. Abnormal profits are evaluated as six-month buy-and-hold returns of the stock minus the six-month buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market and momentum based on Daniel et al., 1997 and Wermers, 2004. Actual peer stock profits are replaced by hypothetical own stock profits.
Remainder Peer-Stock Ret	Difference between actual peer stock abnormal return (Overall DGTW-Adj Ret) and hypothetical own-stock abnormal return (Pseudo Own-Stock Ret)
Var Ratio Adj	|1-VR(1,5)|, expressed as a percentage. VR(1,5) is the ratio of the (variance of 5-day returns/5) to the variance of 1-day returns (Lo and McKinlay, 1988). We require more than 10 observations of 5-day returns within an announcement quarter.
Independent Variables	
Absolute Earnings Surprise	Absolute value of earnings in quarter t minus earnings in quarter t-4, scaled by market capitalization.
Book-to-Market	Book to market ratio.
Cash Ratio	Cash and bank balance divided by total assets at the end of the previous quarter.
High_Comove	Indicator variable equal to one if the comovement of a stock's returns with industry returns during the pre-regulation period is above the median comovement in the sample, and zero otherwise. To evaluate the comovement of a stock's returns with the industry, we modify the methodology used in Piotroski and Roulstone (2004). We first regress the firm's weekly stock return on the current and prior week's value-weighted industry return (excluding the firm's returns). The firm-specific measure of comovement is evaluated as the log of the ratio of R-square and (1-R-square) obtained from the regression.
High_Pairwise_Corr	Indicator variable equal to one if the pairwise correlation of insiders' own firm's weekly return with a given peer firm's weekly return evaluated during the pre-regulation period is above the median pairwise correlation in the sample, and zero otherwise.
Insiders' Ownership Fraction	The fraction of insiders' ownership.

Variable	Description
Institutional Ownership Fraction	The fraction of institutional ownership.
Leverage	Debt divided by total assets at the end of the previous quarter.
log(Assets)	Log of total assets at the end of the previous quarter.
log(M/A)	Log of market capitalization two days before the earnings announcement divided by the total assets at the end of the previous quarter.
log(Sales)	Log of sales at the end of the previous quarter.
log(Size)	Log of market capitalization.
Non-Peer_Stock	Indicator variable equal to one for firms that do not belong to the industry of the insider's own firm, and zero otherwise.
Own_Stock	Indicator variable equal to one for insider's own firm, and zero otherwise.
Peer_Stock	Indicator variable equal to one for firms that belong to the industry of the insider's own firm, and zero otherwise.
Post	Indicator variable equal to one for the period after the adoption of Insider Trading Regulation, 2015 on January 15, 2015. It is equal to zero before the Companies Act 2013 is effective, i.e., before September 12, 2013. The period between September 12, 2013, and January 15, 2015, is considered as a transition period and hence excluded from the analysis.
Tangibility	Net property, plant, and equipment divided by total assets at the end of the previous quarter.
Volatility	The standard deviation of daily market-adjusted stock returns of a firm during its announcement quarter defined as the lagged earnings announcement date +2 days through current quarter earnings announcement date -1 day.

FIGURE 1: Predicted Trading Behavior after Stricter Insider Trading Regulations

The figure shows the predicted change in informed trading following a stricter insider trading regulation. For a focal insider, say insider in Firm A, informed trading in own stock decreases while informed trading in peer-firm B increases. Therefore, for the focal firm (Firm A), there is a decrease in informed trading by own-firm insiders but an increase in informed trades by insiders of peer firms.

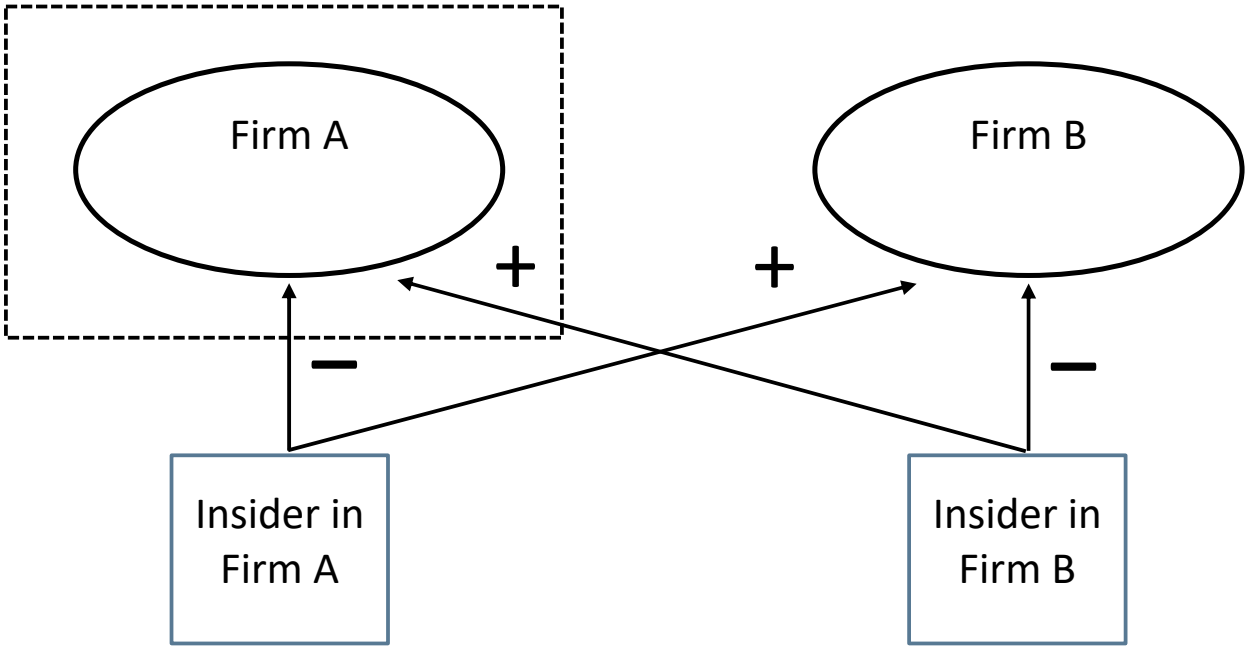

TABLE 1: Sample Construction

The table provides details of sample construction. We examine the insider-reported trades on the Bombay Stock Exchange (BSE) over the period 2012 -2017.

		Insiders	Insider trades in own stock	Insider Firms
(i)	Total number reporting (Source: Prowess)	12,890	68,983	1,753
(ii)	Total number reporting with at least two trades and at least one odd-lot trade (Source: Prowess)	6,293	56,486	1,322
(iii)	Uniquely matched insiders (Source: Prowess and BSE data)	1,312	11,090	769
	% matched (iii)/(ii)	21%	20%	58%
(iv)	Uniquely identified (with available returns and financial data)	943	13,912*	533

* Includes smaller trades available in the BSE data but not required to be reported.

TABLE 2: Likelihood of Insider Trades in Own Stocks and Peer Stocks

This table reports results for the effect of insider trading regulation on the likelihood of firm insiders to trade in own and peer stocks. The unit of analysis is insider-insider's own-firm-quarter observations. The dependent variable, *Own-Stock-Trade* $_{(1,0)}$, (*Peer-Stock-Trade* $_{(1,0)}$) is an indicator variable equal to one when an insider trades in her own stock (peer stock) during the earnings announcement quarter of her own firm, and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors clustered at insider firm- quarter level are in parentheses. All variables are described in Appendix A.

	(1) **Own-Stock-Trade** $_{(1,0)}$	**(2)** **Peer-Stock-Trade** $_{(1,0)}$	**(3)** **Own-Stock-Trade** $_{(1,0)}$	**(4)** **Peer-Stock-Trade** $_{(1,0)}$
Post	-0.0372***	0.0091**	-0.0368***	0.0088***
	(0.007)	(0.004)	(0.007)	(0.003)
Fixed Effects	INDUSTRY	INDUSTRY	INSIDER	INSIDER
Cluster level	Insider Firm - Quarter	Insider Firm - Quarter	Insider Firm - Quarter	Insider Firm - Quarter
Observations	19,459	19,459	19,459	19,459
R^2	0.02	0.05	0.14	0.47

TABLE 3: Likelihood of Insider Trades in Own Stocks and Peer Stocks: Comovement

This table presents the effect of insider trading regulation on the likelihood of firm insiders to trade in own and peer stocks for different levels of industry comovement. The unit of analysis is insider-insider's firm-quarter. The dependent variable, *Own-Stock-Trade* $_{(1,0)}$ *(Peer-Stock-Trade* $_{(1,0)}$), is an indicator variable equal to one when an insider trades in their own stock (peer stock) during her own firm's announcement quarter and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period and zero otherwise. *High_Comove* is an indicator variable equal to one if the comovement of insider's own firm's stock returns with the industry returns (during the pre-regulation period) is above the median comovement in the sample, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors clustered at insider firm- quarter level are in parentheses. All variables are described in Appendix A.

	(1)	**(2)**
	Own-Stock-Trade $_{(1,0)}$	**Peer-Stock-Trade** $_{(1,0)}$
Post	-0.0389***	0.0031
	(0.010)	(0.005)
Post X *High_Comove*	-0.0205	0.0154*
	(0.015)	(0.008)
High_Comove	0.0110	0.0313***
	(0.013)	(0.007)
Fixed Effects	INDUSTRY	INDUSTRY
Cluster level	Insider Firm - Quarter	Insider Firm - Quarter
Observations	17,690	17,690
R^2	0.03	0.07
Test of Hypothesis		
Post + *Post* X *High_Comove*	-0.0594***	0.0185***
F-stat	28.42	8.371

TABLE 4: Univariate for Profitability of Insider Trades in Own Stocks and Peer Stocks

This table presents the average abnormal profitability of own-stock- and peer-stock trades by firm insiders before and after the new insider trading regulations. Abnormal returns are measured as *Overall DGTW-Adj Returns* defined as the six-month abnormal buy-and-hold returns calculated as six-month buy-and-hold returns of the stock minus the six months buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market, and momentum, based on the approach in Daniel, Grinblatt, Titman, and Wermers (1997) with the modifications specified in Wermers (2004). The number of insider trades in each category is reported in the brackets. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively for the differences. All the variables are defined in Appendix A.

Overall DGTW-Adj Returns for Insider Trades			
	Post=0	Post=1	(Post=1) - (Post=0)
Own Stock	0.0294 [6,458]	0.0340 [7,454]	0.0046
Peer Stock	-0.0255 [1,179]	0.0208 [2,276]	0.0463***
Own Stock-Peer Stock	0.0549***	0.0132	

TABLE 5: Profitability of Insider Trades in Own Stock and Peer Stocks

This table reports the regression results for the effect of insider trading regulation on the profitability of trades by firm insiders in their own stock and stocks of peer firms. The sample consists of trades by insiders in their own firm and peer firms. The unit of analysis is an insider- stock- trade date observation. The dependent variable, *Overall DGTW-Adj Ret*, is the abnormal returns evaluated based on the approach in Daniel, Grinblatt, Titman, and Wermers (1997) along with the modifications specified in Wermers (2004). The abnormal returns are calculated as the six-month buy-and-hold returns of the stock minus the six-month buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market and momentum. *Own_Stock* is an indicator variable equal to one for insider's own firm and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors clustered at the stock-trade date level are in parentheses. All variables are described in Appendix A.

	(1)	**(2)**
	Overall DGTW-Adj Ret	**Overall DGTW-Adj Ret**
Own_Stock	0.0661***	0.0637***
	(0.013)	(0.018)
Post	0.0417***	0.0275*
	(0.014)	(0.015)
Post X *Own_Stock*	-0.0376**	-0.0679***
	(0.016)	(0.018)
Fixed Effects	INDUSTRY	INSIDER
Cluster level	Stock - Trade Date	Stock - Trade Date
Observations	17,367	17,367
R^2	0.07	0.36
Test of Hypothesis		
Post + *Post* X *Own_Stock*	0.00412	-0.0404***
F-stat	0.344	14.45

TABLE 6: Profitability of Insider Trades in Own Stock and Peer Stocks: Comovement

This table presents the effect of insider trading regulation on the profitability of trades by firm insiders for different levels of industry comovement. The sample consists of trades by insiders in their own firm and peer firms. The unit of analysis is insider-firm- trade date observations. The dependent variable, *Overall DGTW-Adj Ret,* is abnormal return evaluated based on the approach in Daniel, Grinblatt, Titman, and Wermers (1997) along with the modifications specified in Wermers (2004). The abnormal returns are calculated as the six-month buy-and-hold returns of the stock minus the six-month buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market, and momentum. *High_Comove* is an indicator variable equal to one if the comovement of a stock's returns with the industry returns during the pre-regulation period is above the median comovement in the sample and zero otherwise. *Own_Stock* is an indicator variable equal to one for insider's own firm and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors clustered at stock- trade date level are in parentheses. All variables are described in Appendix A.

	Overall DGTW-Adj Ret
High_Comove	0.0033
	(0.025)
Own_Stock	0.0377
	(0.023)
High_Comove X *Own Stock*	0.0635**
	(0.027)
Post	0.0365
	(0.027)
Post X *Own_Stock*	0.0026
	(0.029)
Post X *Own_Stock* X *High_Comove*	-0.0725**
	(0.034)
Post X *High_Comove*	0.0139
	(0.031)
Fixed Effects	INDUSTRY
Cluster level	Stock - Trade Date
Observations	16,309
R^2	0.08
Test of Hypothesis	
Post + Post X *High_Comove*	0.0504***
F-stat	11.03

TABLE 7: Profitability of Insider Trades in Own Stock and Peer Stocks: Decomposition

This table presents the decomposition of insider trading profits into industry-specific and firm-specific components. The sample consists of trades by insiders in their own firm and peer firms. The unit of analysis is insider-firm- trade date observations. The dependent variable in column (1) and column (3), *Industry Ret,* is the value-weighted average of abnormal returns of firms within the industry of the traded stock. The abnormal returns (*Overall DGTW-Adj Ret)* are calculated as excess buy-and-hold returns over a characteristic-based benchmark following Daniel et al. (1997). The dependent variable in column (2) and column (4), *Firm-specific Ret,* is the difference between *Overall DGTW-Adj Ret* and *Industry Ret*. *Own_Stock* is an indicator variable equal to one for insider's own firm and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors, clustered at the industry-trade-date level for the regression results in Columns (1) and (3) and at the stock-trade-date level for regressions results in Columns (2) and (4), are in parentheses. All variables are described in Appendix A.

	(1)	**(2)**	**(3)**	**(4)**
	Industry Ret	**Firm-specific Ret**	**Industry Ret**	**Firm-specific Ret**
Own_Stock	-0.0035	0.0696***	-0.0288***	0.0925***
	(0.005)	(0.013)	(0.007)	(0.017)
Post	0.0293***	0.0124	0.0232***	0.0043
	(0.005)	(0.013)	(0.006)	(0.015)
Post X *Own_Stock*	0.0131**	-0.0507***	0.0237***	-0.0916***
	(0.006)	(0.015)	(0.007)	(0.018)
Fixed Effects	INDUSTRY	INDUSTRY	INSIDER	INSIDER
Cluster level	Industry - Trade Date	Stock - Trade Date	Industry - Trade Date	Stock - Trade Date
Observations	17,367	17,367	17,367	17,367
R^2	0.11	0.08	0.37	0.36
Test of Hypothesis				
Post + *Post* X *Own_Stock*	0.0423***	-0.0382***	0.0469***	-0.0873***
F-stat	222.2	27.27	117.1	61.25

TABLE 8: Profitability of Pseudo Own-Stock Trades

This table presents the effect of insider trading regulation on the profitability of hypothetical trades by firm insiders in their own stock and hypothetical idiosyncratic profits. This sample consists of peer trades by insiders. The unit of analysis is insider-firm- trade date observations. The dependent variable, *Overall DGTW-Adj Ret*, is the abnormal returns evaluated based on the approach in Daniel, Grinblatt, Titman, and Wermers (1997) along with the modifications specified in Wermers (2004). The abnormal returns are calculated as the six-month buy-and-hold returns of the stock minus the six-month buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market, and momentum. The dependent variable *Pseudo Own-Stock Ret* is the abnormal profitability (evaluated as the six-month buy-and-hold returns of the stock minus the six-month buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market and momentum based on Daniel et al., 1997 and Wermers, 2004) of a hypothetical own-stock trade on the date and in the same direction (buy/sell) as that of an actual peer-stock trade by an insider. Actual peer stock profits are replaced by hypothetical own stock profits. The dependent variable *Remainder Peer-Stock Ret* is the difference between actual peer stock abnormal return and hypothetical own-stock abnormal return. *Industry Ret* is the value-weighted average of abnormal returns of firms within the industry of the traded stock. Industry Adjusted Pseudo Own-Stock Ret is the difference between *Pseudo Own-Stock Ret* and *Industry Ret*. *High_Pairwise_Corr* is an indicator variable equal to one if the pairwise correlation of insiders' own-firm returns and a given peer-firm returns evaluated during the pre-regulation period is above the median and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors clustered at the stock-trade date level are in parentheses. All variables are described in Appendix A.

	(1) Overall DGTW-Adj Ret	(2) Pseudo Own-Stock Ret	(3) Remainder Peer-Stock Ret	(4) Industry Ret	(5) Industry Adjusted Pseudo Own-Stock Ret
High_Pairwise_Corr	-0.1134***	-0.0759***	-0.0375	0.0300*	-0.1059***
	(0.030)	(0.027)	(0.039)	(0.0507)	(0.0008)
Post	-0.0610*	-0.0806**	0.0196	0.0372**	-0.1178***
	(0.035)	(0.032)	(0.045)	(0.0157)	(0.0010)
Post X *High_Pairwise_Corr*	0.1078***	0.1159***	-0.0081	-0.0237	0.1397***
	(0.038)	(0.034)	(0.047)	(0.1518)	(0.0002)
Fixed Effects	INDUSTRY	INDUSTRY	INDUSTRY	INDUSTRY	INDUSTRY
Cluster level	Stock - Trade Date	Stock - Trade Date	Stock - Trade Date	Stock - Trade Date	Stock - Trade Date
Observations	2,605	2,605	2,605	2,605	2,605
R^2	0.09	0.04	0.07	0.06	0.05
Test of Hypothesis					
Post + *Post* X *High_Comove*	0.0468***	0.0353**	0.0115	0.0135**	0.0218
F-stat	9.260	5.466	0.337	5.539	2.379

TABLE 9: Characteristics of Matched-Insiders' Own Firms

This table reports the descriptive statistics for firms of at least one identified insider. The unit of analysis is firm-earnings quarter observations. All variables are described in Appendix A.

Variable	**# of obs.**	**Mean**	**P25**	**Median**	**P75**	**Std. Dev**
High_Comove	7,164	0.54	0.00	1.00	1.00	0.50
Average Daily Illiquidity	7,164	0.0636	0.0001	0.0004	0.0093	0.2548
EBIT/A	7,164	0.097	0.035	0.083	0.144	0.106
Price Non-sync	5,734	0.807	0.699	0.870	0.967	0.191
Jump Ratio	3,189	0.125	-0.059	0.093	0.298	0.282
Var Ratio Adj	5,976	56.93	16.59	35.43	68.22	59.59
log(Size)	7,164	7.65	6.04	7.48	9.02	2.19
Book-to-Market	7,164	1.14	0.35	0.74	1.50	1.24
Institutional Ownership Fraction	7,164	0.27	0.03	0.22	0.46	0.25
Insiders' Ownership Fraction	7,164	0.54	0.44	0.56	0.66	0.16
Volatility	7,164	0.03	0.02	0.03	0.04	0.01
log(M/A)	7,164	-0.41	-1.24	-0.42	0.45	1.21
log(Sales)	7,164	6.35	5.15	6.39	7.74	2.04
log(Assets)	7,164	8.12	6.82	8.00	9.31	1.82
Leverage	7,164	0.22	0.06	0.20	0.34	0.17
Cash Ratio	7,164	0.05	0.01	0.02	0.06	0.08
Tangibility	7,164	0.27	0.11	0.24	0.40	0.19

TABLE 10: Effect on Stock Liquidity

This table presents the effect of insider trading regulation on the liquidity of stocks. The unit of analysis is firm-quarter observations. The dependent variable, *Average Daily Illiquidity,* is the daily stock illiquidity (following Amihud 2002) averaged over an announcement quarter defined as the lagged earnings announcement date +2 days through current quarter earnings announcement date -1 day. *Post* is an indicator variable equal to one during the post-regulation period and zero otherwise. *High_Comove* is an indicator variable equal to one if the comovement of insider's stock's returns with the industry returns (during the pre-regulation period) is above the median comovement in the sample, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Standard errors clustered by quarter are in parentheses. All variables are described in Appendix A.

	Average Daily Illiquidity	
Post	-0.0514***	-0.0533***
	(0.016)	(0.018)
Post X *High_Comove*	0.0531***	0.0644***
	(0.011)	(0.012)
High_Comove	-0.0381***	
	(0.011)	
log(Size)	-0.0321***	-0.0232***
	(0.003)	(0.007)
Book-to-Market	0.0121**	0.0287***
	(0.004)	(0.008)
Institutional Ownership Fraction	0.0294***	0.0575***
	(0.010)	(0.018)
Insiders' Ownership Fraction	-0.0340	-0.0537
	(0.020)	(0.037)
Volatility	1.1732	0.6998
	(0.762)	(0.497)
Observations	7,164	7,164
R2	0.16	0.45
Fixed Effects	INDUSTRY	FIRM
Cluster	Quarter	Quarter
Test of Hypothesis		
Post + Post X High_Comove	0.00169	0.0111
F-stat	0.0336	1.461

TABLE 11: Effect on Stock Price Informativeness

This table reports the effect of insider trading regulation on the informativeness of stock prices. The unit of analysis is firm-quarter observations. The dependent variable is *EBIT/A*, quarterly Earnings Before Interest and Tax divided by Total Assets of the previous quarter. *Post* is an indicator variable equal to one during the post-regulation period and zero otherwise. *High_Comove* is an indicator variable equal to one if the comovement of insider's stock's returns with the industry returns (during the pre-regulation period) is above the median comovement in the sample, and zero otherwise. *log(M/A)* is the log of Market Capitalization divided by Total Assets. The regression includes *log(Sales), log(Assets), Leverage, Cash Ratio, Tangibility, Institutional Ownership Fraction, Insiders' Ownership Fraction*, the interaction of these variables with *log(M/A)*, and lagged *EBIT/A* as controls. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses. All variables are described in Appendix A.

	EBIT/A	
log(M/A) X Post	0.0107***	0.0181***
	(0.002)	(0.002)
log(M/A) X Post X High_Comove	-0.0128***	-0.0188***
	(0.003)	(0.003)
Post	-0.0030	0.0056***
	(0.002)	(0.002)
log(M/A)	0.0182***	-0.0178***
	(0.004)	(0.005)
Post X High_Comove	-0.0137***	-0.0153***
	(0.004)	(0.003)
log(M/A) X High_Comove	0.0061**	0.0068**
	(0.003)	(0.003)
High_Comove	0.0164***	-
	(0.005)	-
Observations	7,164	7,164
R^2	0.62	0.75
Controls	Yes	Yes
Fixed Effects	INDUSTRY	FIRM
Cluster	Quarter	Quarter
Test of Hypothesis		
Post X log(M/A) + Post X log(M/A) X High_Comove	-0.0021	-0.0007
F-stat	1.237	0.153

TABLE 12: Effect on Stock Price Informativeness: Alternative Measures

This table reports the effect of insider trading regulation on the informativeness of stock prices. The unit of analysis is firm-quarter observations. The dependent variables are *Price Non-sync*, *Jump Ratio*, and *Var Raio Adj*. *Price Non-sync* is 1-R^2 from the regression of weekly stock returns on weekly index returns in a quarter. *Jump Ratio* is the ratio of *Earnings Announcement CAR* divided *Total Quarter CAR*. *Var Ratio Adj* is |1-*VR(1,5)*|, expressed in percentage, where *VR(1,5)* is the ratio of the return variance over 5 days to the return variance over 1 day, divided by the period length, calculated for each quarter. *Post* is an indicator variable equal to one during the post-regulation period and zero otherwise. *High_Comove* is an indicator variable equal to one if the comovement of insider's stock's returns with the industry returns (during the pre-regulation period) is above the median comovement in the sample, and zero otherwise. The regression includes *log(Sales), log(Assets), Leverage, Cash Ratio, Tangibility, Institutional Ownership Fraction, Insiders' Ownership Fraction*, and lagged *EBIT/A* as controls. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses. All variables are described in Appendix A.

	Price Non-sync	**Jump Ratio**	**Var Ratio Adj**
Interpretation: Higher Value =	More informative prices	Less informative prices	Less informative prices
Post	-0.0386	-0.0006	-24.217***
	(0.024)	(0.023)	(4.961)
Post X High_Comove	0.0280	-0.0237	11.070**
	(0.021)	(0.030)	(3.916)
Observations	5,734	3,189	5,976
R^2	0.23	0.20	0.21
Controls	Yes	Yes	Yes
Fixed Effects	FIRM	FIRM	FIRM
Cluster	Quarter	Quarter	Quarter
Test of Hypothesis			
Post + Post X High_Comove	-0.0106	-0.0243	-13.147***
F-stat	0.0944	0.824	16.22

Online Appendix

TABLE A.1: Profitability of Own-Stock and Peer-Stock Trades around Earnings Announcement

This table presents the results for the profitability of trades by insiders in their own-firm- and peer-firm stocks during the high earnings-related information period and low earnings-related information period. In a given own-firm quarter, the period between t-10 to t+1 days around the own-firm earnings announcement date is considered as High Earnings Information Period whereas the remaining quarter is considered as Low Earnings Information Period. The sample consists of trades by insiders in their own firm and peer firms. The unit of analysis is insider-stock-trade-date observations. The dependent variable, *Overall DGTW-Adj Ret*, is the abnormal returns evaluated based on the approach in Daniel, Grinblatt, Titman, and Wermers (1997) along with the modifications specified in Wermers (2004). The abnormal returns are calculated as the six-month buy-and-hold returns of the stock minus the six-month buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market and momentum. *Own_Stock* is an indicator variable equal to one for trades by an insider in her own firm and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors clustered at the stock-trade-date level are in parentheses. All variables are described in Appendix A.

Dependent Variable= **Overall DGTW-Adj Ret**	**(1)** **High Earnings Information Period**	**(2)** **Low Earnings Information Period**
Own_Stock	0.1321***	0.0611***
	(0.035)	(0.014)
Post	0.1008***	0.0313**
	(0.034)	(0.015)
Post X *Own_Stock*	-0.1071**	-0.0269
	(0.046)	(0.017)
Fixed Effects	INDUSTRY	INDUSTRY
Cluster level	Stock - Trade Date	Stock - Trade Date
Observations	1,482	15,885
R^2	0.17	0.07

TABLE A.2: Profitability of Insider Trades in All Stocks

This table reports the results for the effect of insider trading regulation on the profitability of the trades by firm insiders in their own-firm stock, stocks of peer firms, and stocks of non-peer. The unit of analysis is insider-stock-trade date observations. The dependent variable, *Overall DGTW-Adj Ret*, is a six-month abnormal buy-and-hold return evaluated based on the approach in Daniel, Grinblatt, Titman, and Wermers (1997) along with the modifications specified in Wermers (2004). The abnormal returns are calculated as the six-months buy-and-hold returns of the stock minus the six-month buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market and momentum. *Own_Stock* is an indicator variable equal to one for insider's own firm and zero otherwise. *Peer_Stock* is an indicator variable equal to one for firms that belong to the industry of the insider's firm and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors clustered at the stock-trade date level are in parentheses. All variables are described in Appendix A.

	(1) **Overall DGTW-Adj Ret**	**(2)** **Overall DGTW-Adj Ret**
Own_Stock	0.0380***	0.0569***
	(0.005)	(0.008)
Post	0.0068***	0.0050*
	(0.002)	(0.003)
Post X *Own_Stock*	-0.0032	-0.0448***
	(0.007)	(0.009)
Peer_Stock	-0.0104	-0.0269**
	(0.011)	(0.011)
Post X *Peer_Stock*	0.0392***	0.0414***
	(0.014)	(0.014)
Fixed Effects	INDUSTRY	INSIDER
Cluster level	Stock - Trade Date	Stock - Trade Date
Observations	105,445	105,445
R^2	0.01	0.07
Test of Hypotheses		
Post + *Post* X *Own_Stock*	0.0036	-0.0398***
F-stat (*Post* + *Post* X *Own_Stock*)	0.271	20.42
Post + *Post* X *Peer_Stock*	0.0460***	0.0464***
F-stat (*Post* + *Post* X *Peer_Stock*)	11.76	11.87

TABLE A.3: Profitability of Insider Trades in All Stocks: Decomposition

This table presents the decomposition of the trading profits of insider trades (in their own stocks, peer stocks, and non-peer stocks) into industry-specific and firm-specific components. The unit of analysis is insider-stock-trade-date observations. The dependent variable in Columns (1) and (3), *Industry Ret,* is the value-weighted average of abnormal returns of firms within the industry of the traded stock. The abnormal returns (*Overall DGTW-Adj Ret*) are calculated as the excess buy-and-hold returns over a characteristic-based benchmark following Daniel et al. (1997). The dependent variable in column (2) and column (4), *Firm-specific Ret,* is evaluated as the difference between *Overall DGTW-Adj Ret* and *Industry Ret*. *Own_Stock* is an indicator variable equal to one for insider's own firm and zero otherwise. *Peer_Stock* is an indicator variable equal to one for firms that belong to the industry of the insider's firm and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors, clustered at the industry- trade date level for the regression results in column (1) and column (3) and at stock- trade date level for regressions results in column (2) and column (4), are in parentheses. All variables are described in Appendix A.

	(1)	**(2)**	**(3)**	**(4)**
	Industry Ret	**Firm-specific Ret**	**Industry Ret**	**Firm-specific Ret**
Own_Stock	-0.0281***	0.0661***	-0.0442***	0.1012***
	(0.002)	(0.005)	(0.003)	(0.008)
Post	0.0005	0.0063***	0.0001	0.0049*
	(0.001)	(0.002)	(0.001)	(0.002)
Post X *Own_Stock*	0.0450***	-0.0482***	0.0517***	-0.0965***
	(0.003)	(0.007)	(0.004)	(0.009)
Peer_Stock	-0.0239***	0.0135	-0.0171***	-0.0098
	(0.005)	(0.011)	(0.005)	(0.011)
Post X *Peer_Stock*	0.0310***	0.0082	0.0251***	0.0163
	(0.005)	(0.013)	(0.005)	(0.013)
Fixed Effects	INDUSTRY	INDUSTRY	INSIDER	INSIDER
Cluster level	Industry - Trade Date	Stock - Trade Date	Industry - Trade Date	Stock - Trade Date
Observations	105,445	105,445	105,445	105,445
R^2	0.02	0.01	0.06	0.09
Test of Hypotheses				
Post + *Post* X *Own_Stock*	0.0455***	-0.0420***	0.0518***	-0.0916***
F-stat (*Post* + *Post* X *Own_Stock*)	282	35.15	211.3	99.78
Post + *Post* X *Peer_Stock*	0.0315***	0.0145	0.0252***	0.0212
F-stat (*Post* + *Post* X *Peer_Stock*)	36.55	1.231	22.05	2.626

TABLE A.4: Profitability of Insider Trades: High Governance Firms

This table reports the results for the effect of insider trading regulation on the profitability of trades by insiders of high-governance firms. The unit of analysis is insider-stock-trade-date observations. The dependent variable, *Overall DGTW-Adj Ret*, is a six-month abnormal buy-and-hold return evaluated based on the approach in Daniel, Grinblatt, Titman, and Wermers (1997) along with the modifications specified in Wermers (2004). The abnormal returns are calculated as the six-month buy-and-hold returns of the stock minus the six-month buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market and momentum. The dependent variable, *Industry Ret,* is the value-weighted average of abnormal return (*Overall DGTW-Adj Ret*) of firms within the industry of the traded stock. The dependent variable, *Firm-specific Ret,* is the difference between *Overall DGTW-Adj Ret* and *Industry Ret*. *Own_Stock* is an indicator variable equal to one for insider's own firm and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors clustered at the stock-trade date level are in parentheses. All variables are described in Appendix A.

	(1) **Overall DGTW-Adj Ret**	**(2)** **Industry Ret**	**(3)** **Firm-specific Ret**
Own_Stock	0.5020***	0.0294*	0.4727***
	(0.049)	(0.015)	(0.052)
Post	0.1765***	0.0763***	0.1002
	(0.062)	(0.017)	(0.066)
Post X *Own_Stock*	-0.3640***	-0.0334*	-0.3306***
	(0.070)	(0.019)	(0.073)
Fixed Effects	INDUSTRY	INDUSTRY	INDUSTRY
Cluster level	Stock- Trade Date	Industry - Trade Date	Stock - Trade Date
Observations	899	899	899
R^2	0.22	0.21	0.23
Test of Hypothesis			
Post + *Post* X *Own_Stock*	-0.187***	0.0429***	-0.230***
F-stat	15.68	15.27	20.53

TABLE A.5: Likelihood of Insider Trades in Own Stocks and Peer Stocks for Alternative Pre- and Post- Regulation Period

This table reports the results of the effect of insider trading regulation on the likelihood of firm insiders to trade in own and peer stocks for alternative periods for pre- and post-regulation. *Extended Transition Window* reports the results when the period after the effective date of the Prohibition of Insider Trading Regulation, i.e., after May 15, 2015, is considered as the post-regulation period and the pre-regulation period is the same as before. Specifically, for the extended transition window, *Post* is an indicator variable equal to one after May 15, 2015, and zero before September 12, 2013 (and the period between the two dates is considered as a transition period). *No Transition Window* reports the results when the period after the adoption date of the Prohibition of Insider Trading Regulation i.e., after January 15, 2015, is considered as the post-regulation period and the period before that is considered as pre-regulation period. Specifically, for no transition window, *Post* is an indicator variable equal to one after January 15, 2015, and zero otherwise. The unit of analysis is insider-own-firm-quarter level observations. The dependent variable in column (1) and column (3), *Own-Stock-Trade* $_{(1,0)}$, is an indicator variable equal to one when an insider trades in her own stock during the earnings announcement quarter of her own firm, and zero otherwise. The dependent variable in column (2) and column (4), *Peer-Stock-Trade* $_{(1,0)}$, is an indicator variable equal to one when an insider trades in a peer stock during the earnings announcement quarter of her own firm, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors clustered at insider firm- quarter level are in parentheses. All variables are described in Appendix A.

	Extended Transition Window		***No Transition Window***	
	(1)	**(2)**	**(3)**	**(4)**
	Own-Stock-Trade $_{(1,0)}$	**Peer-Stock-Trade $_{(1,0)}$**	**Own-Stock-Trade $_{(1,0)}$**	**Peer-Stock-Trade $_{(1,0)}$**
Post	-0.0401***	0.0086***	-0.0326***	0.0057**
	(0.007)	(0.003)	(0.006)	(0.002)
Fixed Effects	INSIDER	INSIDER	INSIDER	INSIDER
Cluster level	Insider Firm - Quarter	Insider Firm - Quarter	Insider Firm - Quarter	Insider Firm - Quarter
Observations	18,368	18,368	26,084	26,084
R^2	0.15	0.47	0.13	0.45

TABLE A.6: Profitability of Insider Trades for Alternative Pre- and Post- Regulation Period

This table reports the effect of insider trading regulation on the profitability of insider trades in own and peer stocks for alternative periods for pre- and post-regulation. *Extended Transition Window* reports the results when the period after the effective date of the Prohibition of Insider Trading Regulation, i.e., after May 15, 2015, is considered as the post-regulation period and the pre-regulation period is the same as before. Specifically, for the extended transition window, *Post* is an indicator variable equal to one after May 15, 2015, and zero before September 12, 2013 (and the period between the two dates is considered as a transition period). *No Transition Window* reports the results when the period after the adoption date of the Prohibition of Insider Trading Regulation i.e., after January 15, 2015, is considered as the post-regulation period and the period before that is considered as pre-regulation period. Specifically, for no transition window, *Post* is an indicator variable equal to one after January 15, 2015, and zero otherwise.The unit of analysis is insider-stock-trade-date observations. The dependent variable in column (1) and column (3), *Industry Ret,* is the value-weighted average of abnormal return of firms within the industry of the traded stock. The abnormal returns (*Overall DGTW-Adj Ret)* are calculated as excess buy-and-hold returns over a characteristic-based benchmark following Daniel et al. (1997). The dependent variable in column (2) and column (4), *Firm-specific Ret,* is evaluated as the difference between *Overall DGTW-Adj Ret* and *Industry Ret*. *Own_Stock* is an indicator variable equal to one for insider's own firm, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors, clustered at the industry-trade-date level for the regression results in Columns (1) and (3) and at stock- trade date level for regressions results in Columns (2) and (4), are in parentheses. All variables are described in Appendix A.

	Extended Transition Window		***No Transition Window***	
	(1)	**(2)**	**(3)**	**(4)**
	Industry Ret	**Firm-specific Ret**	**Industry Ret**	**Firm-specific Ret**
Own_Stock	-0.0242***	0.0704***	-0.0125**	0.0776***
	(0.007)	(0.018)	(0.006)	(0.014)
Post	0.0190***	0.0091	0.0134***	0.0277**
	(0.006)	(0.015)	(0.005)	(0.013)
Post X Own_Stock	0.0182**	-0.0732***	0.0095	-0.0409**
	(0.008)	(0.019)	(0.006)	(0.016)
Fixed Effects	INSIDER	INSIDER	INSIDER	INSIDER
Cluster level	Industry - Trade Date	Stock - Trade Date	Industry - Trade Date	Stock - Trade Date
Observations	16,104	16,104	22,267	22,267
R^2	0.39	0.37	0.32	0.32
Test of Hypothesis				
Post + *Post* X *Own_Stock*	0.0373***	-0.0641***	0.0229***	-0.0131
F-stat	64.37	28.33	41.11	1.857

TABLE A.7: Profitability of Insider Trades for Alternative Return Horizon

This table reports the results for the effect of insider trading regulation on the profitability of trades by insiders evaluated over a return horizon of 3 months. The unit of analysis is insider-stock-trade-date observations. The dependent variable, *Overall DGTW-Adj Ret*, is 3 months abnormal buy-and-hold return evaluated based on the approach in Daniel, Grinblatt, Titman, and Wermers (1997) along with the modifications specified in Wermers (2004). The abnormal returns are calculated as the 3 months buy-and-hold returns of the stock minus the 3 months buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market and momentum. The dependent variable, *Industry Ret,* is the value-weighted average of abnormal return (*Overall DGTW-Adj Ret*) of firms within the industry of the traded stock. The dependent variable, *Firm-specific Ret,* is evaluated as the difference between *Overall DGTW-Adj Ret* and *Industry Ret*. *Own_Stock* is an indicator variable equal to one for insider's own firm and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors clustered at the stock-trade date level are in parentheses. All variables are described in Appendix A.

	(1) Overall DGTW-Adj Ret	(2) Industry Ret	(3) Firm-specific Ret
Own_Stock	0.0596***	-0.0175***	0.0772***
	(0.013)	(0.005)	(0.013)
Post	0.0386***	0.0075*	0.0311***
	(0.012)	(0.004)	(0.011)
Post X Own_Stock	-0.0617***	0.0144***	-0.0762***
	(0.013)	(0.005)	(0.013)
Fixed Effects	INSIDER	INSIDER	INSIDER
Cluster level	Stock - Trade Date	Industry - Trade Date	Stock - Trade Date
Observations	17,367	17,367	17,367
R^2	0.30	0.29	0.30
Test of Hypothesis			
Post + Post X Own_Stock	-0.0231***	0.0219***	-0.0451***
F-stat	10.08	59.09	35.10

TABLE A.8: Restricting the Sample to Purchase Transactions in Own and Peer Stocks

Panel A: Likelihood of Own- and Peer- Stock-Purchases

This table reports the results for the effect of insider trading regulation on the likelihood of own-stock-purchases and peer-stock-purchases. The dependent variable, *Own-Stock-Purchase* $_{(1,0),}$ is an indicator variable equal to one when an insider has a net-buy in own-stock during the earnings announcement quarter of her own firm, and zero otherwise. The dependent variable, *Peer-Stock-Purchase* $_{(1,0),}$ is an indicator variable equal to one when an insider has a net-buy in peer stocks during the earnings announcement quarter of her own firm, and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level in a two-sided test, respectively and $^{\#}$ indicates 10% significance in a one-tailed test. Robust standard errors clustered at the stock-trade date level are in parentheses. All variables are described in Appendix A.

	(1) **Own-Stock-Purchase** $_{(1,0)}$	**(2)** **Peer-Stock-Purchase** $_{(1,0)}$
Post	-0.0627***	0.0049$^{\#}$
	(0.006)	(0.003)
Fixed Effects	INDUSTRY	INDUSTRY
Cluster level	Insider Firm - Quarter	Insider Firm - Quarter
Observations	19,459	19,459
R^2	0.03	0.05

Panel B: Profitability of Own- and Peer- Stock-Purchases

This table reports the results for the effect of insider trading regulation on the profitability of own-stock-purchases and peer-stock-purchases. The unit of analysis is insider-stock-trade date observations. The dependent variable, *Overall DGTW-Adj Ret*, is a six-month abnormal buy-and-hold return evaluated based on the approach in Daniel, Grinblatt, Titman, and Wermers (1997) along with the modifications specified in Wermers (2004). The abnormal returns are calculated as the six-month buy-and-hold returns of the stock minus the six-month buy-and-hold returns of the characteristic-matched portfolio based on size, book-to-market and momentum. *Own_Stock* is an indicator variable equal to one for insider's own firm and zero otherwise. *Post* is an indicator variable equal to one during the post-regulation period, and zero otherwise. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors clustered at the stock-trade date level are in parentheses. All variables are described in Appendix A.

Dependent Variable=	
Overall DGTW-Adj Ret	**Own-Stock-Buys + Peer-Stock-Buys**
Own_Stock	0.0694***
	(0.017)
Post	0.0430**
	(0.018)
Post X *Own_Stock*	-0.0625***
	(0.021)
Fixed Effects	INDUSTRY
Cluster level	Stock - Trade Date
Observations	11,156
R^2	0.10
Test of Hypothesis	
Post + *Post* X *Own_Stock*	-0.0195**
F-stat	4.28