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Empirical Investigations of Foreign Equity Investments in an Emerging Market

A thesis submitted for the award of Doctor of Philosophy

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Declaration of Authenticity and Author's Rights

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Abstract

This thesis examines foreign institutional (portfolio) investors' (FIIs or FIIs) influence on government policy, their trading behaviour, and their implications on firm-level board monitoring in a large emerging market.

In the first empirical investigation, we examine the power of FIIs to directly influence the policy of host government. In a quasi-experimental setting, we find a strong negative stock market reaction to an exogenous policy shock that threatens to increase tax liability of FIIs in India. More importantly, the shock resulted in a daily market withdrawal of approximately 0.309 basis points of market capitalization for an average equity by FIIs. Further, the results also indicate that FIIs' withdrawal has a disruptive effect on several aspects of the stock market including volatility, liquidity and prices. Finally, the effect of the shock seems to have a long-term detrimental effect as, after the tax threat is removed, FIIs do not re-enter the market with the same speed and volume of trading compared to the initial market withdrawal.

In the second empirical investigation, we examine the information content of opportunistic and routine insiders' trades in an emerging market and test whether foreign institutional investors (FIIs) exploit and mimic informative trades. We find that opportunistic trades translate into an incremental return of approximately 243 basis points in the following month of the trade, much higher than previously reported in developed markets. More importantly, by exploiting unique high-frequency trade-level transaction data, we find that FIIs mimic past opportunistic insiders' buy trades and earn superior abnormal returns. In sum, this study implies that opportunistic insiders' trading in emerging markets enables FIIs to reduce their informational disadvantage.

In the third empirical investigation, we explore whether FIIs improve board monitoring. Exploiting the global financial crisis of 2007-08 as an exogenous shock that resulted in a significant decline of FIIs' ownership in the Indian market, we find evidence of a causal link between FIIs' ownership and different dimensions of board monitoring. Specifically, the empirical results suggest that FIIs reduce board size,

busyness, network size, CEO power, and CEO pay, and improve board diligence. However, we also document a negative link between FIIs' ownership and board independence, indicating FIIs may not view independent directors as effective monitors in this market.

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Dedicated to my family members.

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Chapter 1. Introduction

1.1 Foreign equity investment

Foreign equity investment is defined as the investment in equities made by entity located outside the domicile of home country. The growth of foreign equity investments in emerging markets are mostly driven by the pursuit of higher returns and portfolio diversification. The fall of financial and economic barriers to foreign investments, and the globalization have further fuelled a greater integration of the emerging markets with the developed capital markets.

The influx of foreign equity investments in emerging markets has been source for both benefits and concerns. Neo-classical international financial theory suggests that the increase in foreign equity investments in emerging markets leads to lower cost of capital through improved risk sharing between domestic and international investors (Bekaert and Harvey, 2000; Chari and Henry, 2008; Henry, 2000). Lau et al. (2010) argue that as local investors are not diversified enough to reduce the country specific risks and as risks are not shared among foreign investors, a market with relatively higher proportion of domestic investments has higher cost of capital. Thus, an increased foreign equity investment results in diversification of investments that lowers the cost of capital, which attracts real investments. Edison and Warnock (2003) show that the decrease in dividend yields (cost of capital) is much sharper for those markets that attract greater inward foreign equity investments. Errunza (2001) also notes several other benefits of the growing foreign equity investments in emerging markets, including their demand for prompt and quality information, a higher degree of minority shareholder protection, and adequate and timely regulations that govern the market and the trading activities, increase in domestic market competition, and improvement in market efficiency such as liquidity and price efficiency. The presence of foreign investors in the equity market also boosts the confidence of local investors and increase their trading activities, which makes market more liquid, cost-effective and price efficient (Kwabi et al., 2019).

The growth of foreign equity investments also improves the width and breadth of capital market in emerging markets. The lower cost of capital, improved liquidity, enhanced risk sharing, and global diversification opportunities for local investors, due

to the presence of foreign investors in local markets, improve the stock market development. Bekaert et al. (2002) examine the world equity markets and find that ratio of trading volume to Gross Domestic Product (GDP) increased significantly post stock market liberalization in emerging markets. The benefits noted by Erunza (2001) such as informed information efficiency, minority protection, investor confidence, better market regulations and improved corporate control, promotes the development of domestic stock market. Kwabi et al. (2019) examine a comprehensive dataset of 44 countries from 2001 to 2014 and finds that the sub-optimal international portfolio diversification adversely affects the stock-market development. Likewise, they find that that greater foreign investors presence has a positive influence the depth and breadth of domestic stock markets.

Concurrent with the rise in the foreign equity investments has also been the rising instances of market destabilization and crises, raising concern about the linkage between the two. For instance, during the East Asian crisis several countries such as Thailand, Malaysia, Indonesia, Korea and the Philippines experienced a sudden withdrawal of capital flows that perpetuated the crisis leaving the countries in a state of recession. The crisis also had a contagion effect on the developed economies. The foreign equity flow is also blamed for destabilizing effects on domestic market through increased volatility, spill-over of volatility, reversals and contagion effect (Bekaert and Harvey, 2003; Errunza, 2001; Kim and Wei, 2002). Gelos and Wei (2005) argue that lack of adequate, timely and reliable information, along with weak institutional frameworks in emerging markets may fail to support and manage the flows of FIIs, implying potential destabilizing effects.

Several studies also provide contrary evidence on effect of improve foreign equity investments on market liquidity. De La Torre et al. (2007) finds that although stock market liberalization that increase the foreign investments tend to be followed by marginal increment in domestic market capitalization, it is also followed by negative spillover effects such as increased outflow of domestic investments. Rhee and Wang (2009) examine the impact of foreign equity investments on stock liquidity of Indonesian stock market (Jakarta Stock Exchange) and find that contrary to the evidences provided for developed markets, the increased foreign holdings have negative impact on the future liquidity. Economically, they suggest that a 10% increase

in foreign holdings is associated with 2% rise in bid-ask spread, 3% decrease in liquidity depth, and 4% rise in price sensitivity next month.

Using data from South Korea, Kim and Wei (2002) find that FIIs are more likely to engage in herding than in domestic portfolios, thus potentially causing greater volatility in emerging equity markets. Similarly, Aitken (1998) and Kim and Wei (2002) also argue that because FIIs pay little attention to the long-term fundamentals and are largely involved in herding, fickle portfolio flows may significantly enhance volatility (alternatively increase cost of capital), thus destabilize the local stock markets. Sharing a similar view, Aitken (1998) also notes that the fluctuating sentiments of FIIs in emerging markets may create short term, bubble-like booms and bursts.

Foreign equity investors also face their own set of challenges to invest in emerging markets such as higher degree of information asymmetry, economic uncertainty, political risks, and exchange rate risks. Empirically, there is arguments for (Choe et al., 2005; Hau, 2001) and against (Coval and Moskowitz, 2001; Froot et al., 2001; Grinblatt and Keloharju, 2000; Kang and Stulz, 1997) the presence of information disadvantage in other markets. However, recent literature argue that foreign equity investors suffer from information asymmetry due to physical, linguistic and cultural barriers of investing in emerging markets (Bell and Filatotchev, 2012; Chan et al., 2005). The higher information asymmetry turns foreign equity investors into feedback traders- extracting information from recent returns; return chasers- chasing past returns; and herders– trading in the same direction as others.

Forbes and Warnock (2012) argue that the economic uncertainty mediates the relationship between the global risk aversion and foreign capital flows as they are related to the stop (or surges in case of lower economic uncertainty) of foreign capital flows. Foreign equity investors also suffer from political uncertainty. Julio and Yook (2016) uses election timing as a measure of political uncertainty to examine its effect on cross border capital flows and find that foreign capital flows decline substantially during the period just before election and increase only after the uncertainty regarding the political situation is resolved. The effect is also pronounced when the political uncertainty is higher i.e. when elections are more competitive. Lensik et al. (2000)

uses comprehensive dataset of capital flows of 84 developing countries and find robust evidence that political risk leads to increased capital flight. Le and Zak (2006) examine capital flight of 45 developing countries and investigate three type of risks: economic risk, political instability, and policy variability. They find that all three type of risks have significant negative impact on the capital flight, although, economically, political instability is the most important factor. Foreign investors are also cautious about the risk of fluctuating exchange rate or currency devaluation. Eun and Rensik (1988) argues that exchange rate uncertainty is one of the important factors that adversely affects the performance of international portfolios. Fidora et al. (2007) focus on the role of exchange rate volatility as a key determinant of international portfolio allocation. They find that the real exchange rate volatility is an important explanation for the cross-country differences in equity flows. They suggest that reduction in exchange rate volatility from sample mean to zero reduces equity home bias (preference for home countries' equities) by 20%. In a nutshell, these evidences provide us indication that the foreign investors face tremendous challenges to invest in other countries.

These developments have raised the interest of both academics and regulators to understand the behaviour, the driver, and the influence of these foreign equity investors not only at the firm-level but also at the policy-level. Motivated by these issues, this thesis examines the foreign equity investments in one of the largest emerging markets: India.

Dr Manmohan Singh, ex-Prime Minister of India, and Finance Minister at the time of financial liberalization in 1992, opened Indian economy to world by reducing import controls, licencing requirements for investment in infrastructure sector by private investors, creating an environment conducive to foreign investments and making the Indian rupee convertible. The deregulation was also followed by massive changes in laws and regulations that were in support of development of corporate sector. Prior to the deregulation, India was monopolized by a single stock exchange namely Bombay Stock Exchange (BSE), established in 1875, and it was characterized as being inefficient association of brokers. The deregulation then saw formulation of four new institutions such as Securities and Exchanges Board of India (SEBI), National Stock Exchange (NSE), National Securities Clearing Committee (NSCC) and

National Securities Depository Limited (NSDL). Perhaps, one of the most important financial reforms was the establishment of SEBI, as it has introduced rigorous regulatory regimes to ensure transparency in financial transaction. The efficient, transparent, fair and relevant regulations also transformed BSE to become an efficient trading platform like NSE.

NSE, incorporated in 1992 and commenced trading in 1994, is owned by public sector financial institutions comprising domestic and global investors. Since its inception, NSE was way ahead of its time as it allowed anyone, who was qualified, experienced and met minimum financial requirements, trade and later it also became the first exchange to provide modern and fully electronic trading platform.

Based on the market capitalization, as of December 2018, BSE is ranked as 10th largest stock exchange in the world where as NSE is ranked as 11th. Table 1-1 shows the number of listed companies, market capitalization and annual turnover for the fiscal year 2011-12 to 2017-18. As shown, though the number of listed companies in NSE is lower than that of BSE, the market capitalization is identical in value.

Table 1-1: Features of NSE and BSE

This table presents the institutional features of NSE and BSE such as number of listed companies, market capitalization (in Billion Rupees) and Annual turnover (in Billion rupees).

Fiscal year	National Stock Exchange (NSE)			Bombay Stock Exchange (BSE)		
	# of companies	Market Capitalization (Billion ₹)	Annual Turnover (Billion ₹)	# of companies	Market Capitalization (Billion ₹)	Annual Turnover (Billion ₹)
2011-12	1,646	60,965	28,108	5,133	62,149	6,674
2012-13	1,666	62,390	27,082	5,211	63,878	5,487
2013-14	1,688	72,777	28,08	5,336	74,152	5,216
2014-15	1,733	99,301	43,296	5,624	101,492	8,551
2015-16	1,808	93,104	42,369	5,911	9,453	7,194
2016-17	1,817	119,784	50,559	5,302	121,545	9,982
2017-18	1,931	140,441	72,348	5,054	142,249	10,820

Following the financial deregulation in 1992, Indian financial market also witnessed a tremendous growth in international capital mobility. Investments by foreign equity investors in India such as foreign institutional investors and other foreign investors are all clubbed together as “foreign portfolio investors” following the Securities Board of India (SEBI)’s Foreign Portfolio Investors Regulation 2014.

Broadly speaking, the regulation defines foreign portfolio investors as a person[1] (investor) who is not resident in India and not a non-resident Indian. The person (investor) should be legally entitled to invest in securities outside their country of establishment or place of business. The regulation classifies foreign portfolio investors into three categories. First, Category I includes government and government related investors such as central bank, government agencies, sovereign wealth funds, and international and multilateral organizations and agencies. Second, Category II includes mutual funds, investment trusts, (re)insurance companies, banks, asset management companies, investment managers/advisors, portfolio managers, university funds, and pension funds among others. Finally, Category III includes investors not classified under Category I and II such as endowment funds, charitable societies, charitable trusts, foundations, corporate bodies, trusts, individuals and family offices. In this thesis, we use FIIs to denote foreign institutional and portfolio investors.

Table 1-2 shows a general trend in the growth in the FIIs' investments in India. The year 1993-94 show a tremendous growth in FIIs' investments – the result of the financial deregulation. The negative foreign fund flow during 1998-99 was the result of the contagion effect of the East Asian financial crisis. Following further relaxation on rules concerning FIIs such as single approval from SEBI and no restrictions on currency hedging, 2003-04 saw a sharp incline in the investment flow and it stabilised at the similar level till 2006-07. The heightened global liquidity and bullish emerging markets resulted in FIIs' investment of around US$ 25.8 billion in 2007-08.

Following the financial crisis in 2008-09, there was reversal in the foreign fund flow, which result in outflow of around US$12.8 billion, but it was followed by revival in 2009-10 (approximately US$ 28.8 billion). However, in the year 2013-14, the foreign investment came close to the level of early 2000 due to the US Federal Reserve announcement that it would taper its quantitative easing policy by $10 billion per month, to US$ 75 billion (also known as "taper tantrum"), which resulted in significant outflows from emerging market (Ahmed et al., 2017; Aizenman et al., 2016). 2015-16 also saw a significant pull-out by FIIs. The decline was due to the negative response

[1] Section 2(31) of Income Tax Act, 1961 of India explains a person includes an individual, a Hindu undivided family, a company, a firm, an association of persons or body of individuals, a local authority and every artificial judicial person.

to the governments' threat of imposing additional tax liability on the income earned by FIIs on transactions conducted prior to 2015. Such retrospective taxation resulted in FIIs exiting the Indian market.

Table 1-2: Foreign portfolio investments in India

This table shows the trend in foreign portfolio investments (net investments and inflation adjusted) in India from 1990-91 to 2016-17. Source: *Reserve Bank of India, Handbook of Statistics on Indian Economy*

Year	Foreign Portfolio Investment		Inflation-adjusted Foreign Portfolio Investment[2]	
	Billion (INR)	Million (US$)	Billion (INR)	Million (US$)
1990-91	0.11	6.00	0.10	5.40
1991-92	0.10	4.00	0.09	3.52
1992-93	7.48	244.00	6.81	222.10
1993-94	111.88	3,567.00	104.29	3,324.94
1994-95	120.07	3,824.00	108.88	3,467.54
1995-96	91.92	2,748.00	83.59	2,499.09
1996-97	117.58	3,312.00	107.45	3,026.59
1997-98	67.94	1,828.00	63.59	1,710.97
1998-99	**-2.57**	**-61.00**	**-2.27**	**-53.92**
1999-00	131.12	3,026.00	124.05	2,862.82
2000-01	118.20	2,590.00	113.84	2,494.46
2001-02	92.90	1,952.00	89.06	1,871.35
2002-03	45.04	944.00	43.32	907.87
2003-04	518.98	11,356.00	499.69	10,933.95
2004-05	413.12	9,287.00	397.92	8,945.29
2005-06	553.57	12,494.00	530.24	11,967.43
2006-07	318.81	7,060.00	298.79	6,616.68
2007-08	1,106.19	27,433.00	1,041.61	25,831.45
2008-09	**-650.45**	**-14,030.29**	**-596.25**	**-12,861.21**
2009-10	1,539.67	32,396.00	1,370.91	28,845.16
2010-11	1,393.81	30,293.00	1,261.02	27,407.04
2011-12	855.71	17,170.00	781.47	15,680.37
2012-13	1,464.67	26,891.40	1,331.52	24,446.73
2013-14	296.80	4,822.00	271.30	4,407.68
2014-15	2,578.53	42,204.76	2,437.17	39,891.08
2015-16	**-272.03**	**- 4,130.00**	**-259.32**	**-3,937.08**
2016-17	504.82	7,611.57	483.08	7,283.80

Given the growing investments by FIIs in emerging markets and benefits of foreign fund flows, this thesis aims to understand the behaviour and influence of these

[2] Calculated by author.

investors in emerging markets. The three key questions that are explored is the thesis in the context of an emerging market are as follows:

a) Do FIIs have power to influence the host government policies?
b) Do FIIs reduce their information asymmetry by mimicking the insiders' trades?
c) Do FIIs improve the board monitoring?

In Section 1.2, we motivate our key research questions and in Section 1.3, we present the summary of the findings and the main contributions of the empirical investigations. In Section 1.4, we present overall conclusion and in Section 1.5, we present the structure of the thesis.

1.2 Empirical investigations

This thesis comprises of three empirical investigations. The first empirical investigation examines the impact of tax threat on FIIs as well as studies the market power of FIIs to influence host government policies. The second empirical investigation examines the information content of insiders' trading in emerging market, and studies whether FIIs/FIIs are aware of such information content and mimic their insiders' trading direction. The final empirical investigation the attention shifts towards the monitoring role of FIIs as it examines whether FIIs impact board monitoring in emerging market.

1.3.1. Tax threat and disruptive market power of FIIs

The importance of foreign portfolio investors (FIIs), particularly in the capital constrained emerging markets, is theoretically and empirically well documented in the literature (Bekaert and Harvey, 2003). It is argued that countries that are able to attract and retain FIIs should witness beneficial real growth supported by the greater deepening of financial markets and institutional development. For example, higher foreign portfolio investment leads to lower cost of capital, which, in turn, encourages the growth of real investments (Henry, 2000). Errunza (2001) also notes several benefits of the growing presence of FIIs in emerging markets, including FIIs' demand for prompt and quality information, a higher degree of minority shareholder protection,

and adequate and timely regulations that govern the market and the trading activities. Active participation of FIIs also provides confidence to local investors, encouraging them to trade widely, both nationally and internationally, which, in turn, drives up the domestic market competition and renders the market to become more liquid, cost-effective and price efficient. FIIs also provide significant lobbying power for the development of new institutions and services and encourage the adaptation of contemporary trading technology. Therefore, FIIs can help the development of financial markets and efficient governance of institutions. Stulz (1999) further argues that with greater firm disclosure, induced by growing FIIs, market makers and investors (domestic and foreign) who do not have access to inside information, exhibit less anxiety of being exploited by insiders. This lowering of information asymmetry should boost the depth and breadth of investors (domestic and foreign) and market makers, leading to greater industrial diversity, liquidity and lower bid-ask spread in the domestic capital market.

Recognizing the benefits of FIIs, regulators in emerging markets often shape policies not only to attract these investors but also retain their investments (Errunza, 2001; Leuz et al., 2009). However, evidence also suggests that FIIs themselves can influence host government policies to suit their own investment preferences, provided they can exert pressure on domestic shareholders/managers, who, in turn, could lobby domestic regulators to alter their policies to be more favourable to FIIs (Kerner, 2015).

In this empirical study, we argue that FIIs may also possess a direct market-based means of instituting changes in domestic policies by explicitly withdrawing from the market. The consequent stock market implications of such withdrawal could potentially exert pressure on regulators to alter their domestic policies. We test this in the context of the Indian market (FIIs hold around 40% of the market capitalization)[3], by exploiting an unexpected policy announcement that generates a period of nearly five months of uncertainty with a highly probable threat of imposing an additional tax burden on the retrospective transactions of FIIs.

Prior to 2015, FIIs in India had to pay very low or negligible capital gains tax (zero long term capital gain tax and 15% short term capital gain tax) on account of

[3] Source: *Financial Times*, April 13, 2015.

double-taxation treaties and therefore the Indian government was apparently providing tax subsidies to FIIs. Unexpectedly, in early 2015, India made a policy announcement that created ambiguity on whether FIIs would be liable for Minimum Alternate Tax (MAT) on their past transactions. The prospect of retrospective tax liability for FIIs gradually became clearer when the tax authorities started to demand MAT from several prominent FIIs. Although a subsequent policy announcement cleared FIIs of any retrospective tax liability, the five-month period between the two announcements created significant uncertainty about a tax threat for FIIs, essentially raising the prospect of making significant negative changes to the tax subsidies enjoyed by the FIIs. We use this period of five months, referred to as the *MAT threat period,* to answer three questions: *First, what is the trading behaviour (size and direction) of FIIs during the MAT threat period? Second, what are the implications of FIIs' trading on stock volatility, liquidity and returns? Finally, how do FIIs react in the post MAT threat period when the tax threat disappears?*

In terms of theoretical motivation, we use the framework of Bacchetta and Van Wincoop (2000) to examine the first and third questions. The equilibrium model – a modified version of which is presented in Section 2.3.2 – highlights the role of tax burden, one of the costs/barriers to investing in emerging markets. To briefly summarize, the model predicts a significant pull-out by FIIs as a response to the potential retrospective increase in tax liability. The outflow is expected to become more pronounced if the announcement carries incomplete information related to the policy announced. This implies that when policies are uncertain, the withdrawals could be higher as the uncertainty increases the information costs of FIIs. Similarly, the same framework would also suggest that the FIIs' portfolio inflows should increase following the removal of the potential tax liability.

The Indian market is an ideal set-up in which to examine the possibility of a tax threat for several reasons. First, the unexpected MAT threat provides an exogenous shock that enables us to isolate the effect of tax-related reforms/subsidies from other

possible factors that might drive FIIs' trading.[4] Thus, this setting provides us with an ideal quasi-experimental set-up where credible causality can be established. The second advantage is the availability of a unique database that provides granular FIIs' transaction data at the trade-level. This trade-level data enables us to perform an in-depth analysis of differential responses of FIIs' trading as well as determine the impact of the trading on the stock market. Finally, despite its large size, the characteristics of the Indian equity market are nonetheless similar to other emerging economies (Gopalan and Gormley, 2013).[5] For example, like many emerging markets, the Indian market is characterized by a higher ownership concentration, a lower investor protection standards and a weaker environment of legal enforcement (see Bhaumik and Selarka, 2012; Douma et al., 2006; Vig, 2013). This suggests that the findings of this study could potentially be generalized across other, similar emerging markets.

1.3.2. Mimicking the insiders' trades by FIIs

A large body of finance literature suggests that foreign institutional investors (FIIs) face higher information asymmetry in emerging markets (DIIs), and also FIIs investing in the developed markets (see Brennan and Cao, 1997; Choe et al., 2005; Dvořák, 2005; Hau, 2001). Such information asymmetry stems from physical, linguistic, or cultural barriers, resulting in FIIs generally making suboptimal investments relative to local domestic institutional investors (DIIs) (Bell and Filatotchev, 2012; Chan et al., 2005). Prior research also demonstrates that FIIs in emerging markets behave as trend followers and return chasers (Brennan and Cao, 1997; Choe et al., 1999, 2005; Froot et al., 2001; Griffin et al., 2004).

To overcome this informational disadvantage, FIIs demand greater transparency and disclosure, influence corporate governance reforms and board monitoring, and strengthen shareholder activism in local firms (Aggarwal et al., 2011;

[4] Unlike other tax policy changes, the potential tax change used in this paper was significant (as it threatened to increase tax liability by almost 20%) and, to the best of our knowledge, was not contaminated by other information or policy changes. We address the effect of other systematic events during the shock period in the robustness checks (see Section 2.5.3).

[5] India is ranked 9th in the world at the end of 2016 in terms of market capitalization, and 4th in terms of country weights in the MSCI Emerging Markets Index.

Aggarwal et al., 2005; Ferreira and Matos, 2008; Huang and Zhu, 2015). The overall impact of such efforts has not only been positive for FIIs but also for the local market. An alternative approach to improve investment performance is by better utilizing information available from public (e.g. corporate disclosures) and private sources. In this study, we examine one such form of public information, namely corporate insiders' trades, to investigate *whether FIIs improve their investment performance by exploiting the information content of such trades.*[6]

There is extensive empirical evidence which suggests that corporate insiders, such as managers and the board of directors, earn superior abnormal returns through their buy trades (Alldredge and Cicero, 2015; Ke et al., 2003; Piotroski and Roulstone, 2005; Tirapat and Visaltanachoti, 2013).[7] Recently, a growing body of literature related to the information content of insider trading has turned its attention toward distinguishing between opportunistic and routine insiders' trading by examining the sequence of their trades.[8] In general, these studies show that opportunistic insiders' trades convey information about firms' future performance whereas routine trades are predictable and driven by hedging, diversification or liquidity needs. The findings from these studies, focusing on developed markets, show that portfolios based on opportunistic insiders' trades generates higher abnormal returns compared to portfolios based on routine trades (Ali and Hirshleifer, 2017; Cohen et al., 2012b). In this study, we argue that the information content of opportunistic insider trades in

[6] There is of course the possibility that any outsider, including DIIs, could exploit the information content of insiders' trades. However, DIIs may have better information about domestic firms and the local environment compared to FIIs, which could reduce their need to investigate insiders' trades for signals of inside information.

[7] There is little agreement in the literature on the primary sources of profitability for insiders. However, these superior abnormal returns are based on two possible sources of information. First, relative to other investors, they possess superior private information about their company, such as knowledge about their firm's future cash flow or specific corporate events. As such, they can better time the market compared to other outside investors (Ke et al., 2003; Piotroski and Roulstone, 2005; Tirapat and Visaltanachoti, 2013). Second, insiders pay more attention to public information relevant to their firm than outside investors, hence, they are able to generate abnormal profits by trading on public information (Alldredge and Cicero, 2015).

[8] Studies have investigated which types of insider trading transactions contain value-relevant signals, including the position of the insider in the firm, the size and motive of the trade, and the persistence of insider profitability (Cline et al., 2017; Kallunki et al., 2009; Lakonishok and Lee, 2001; Ravina and Sapienza, 2010; Wang et al., 2012).

emerging markets should potentially be more informative to outsiders, as these markets are characterized as having higher informational inefficiency, greater macro and micro opaqueness, higher concentrated ownership, and more lax enforcement of insider trading regulations (see Allen et al., 2005; Bhaumik and Selarka, 2012; Gelos and Wei, 2005; Khanna and Palepu, 2000; Khwaja and Mian, 2005).[9] Therefore, an insider transaction in an emerging market could be an informative signal on the future prospects of the firm.

Given the importance of the information content of insiders' trading to outsiders and the information disadvantage of FIIs, we examine the link between insiders' and FIIs' trading in the Indian market. Specifically, our study investigates two key issues. First, *we test whether FIIs trade in the same direction as past opportunistic insiders, which we refer to as the mimicking hypothesis*. Second, *we investigate whether FIIs, who mimic insiders' opportunistic trades, earn superior abnormal return and hence use this publicly available information to overcome the hurdle of information asymmetry*.

We consider the Indian emerging market as an appropriate setting for three primary reasons. First, the regulation that governs the insider trading in India, namely the Prohibition of Insider Trading 1992, is not as stringent as in the US and other developed markets (Beny, 2005). Specifically, trading by insiders based on price-sensitive information is not considered a criminal offence in India. Hence, insiders in India are more likely to trade on their private information, rendering these trades as a useful signal to gauge the future prospects of the firms involved.[10] Second, the Indian setting provides us with a unique database that allows us to examine the immediate reaction of FIIs following each insider's trade. While most studies on institutional investment suffer from low frequency data, we are able to overcome this issue by using granular and high-frequency FIIs' transaction data at the trade-level. Finally, our

[9] For example, Bhattacharya et al. (2000) and Bhattacharya and Daouk (2002) suggest that the lack of presence of strict insider trading regulations as well as the lower probability of persecution in emerging markets encourages insiders to trade based on private information.

[10] Although our study uses Indian data, the findings are generalizable to other emerging markets, as Gopalan and Gormley (2013) and Helmers et al. (2017) show that the characteristics of the Indian market are similar to those of other emerging markets.

setting is also relevant in an economic sense. The growing size of the India equity market makes it one of the attractive destinations for FIIs. There has been a significant increase in FIIs' equity investment over the past decade in India.[11]

1.3.3. FIIs and board monitoring

Although it is well established that boards are a powerful internal corporate governance mechanism, their effectiveness has been shown to vary greatly (see Adams et al., 2010; Tung, 2011).[12] This variation in effectiveness has motivated academic research that investigates what are the reasons for differences in effectiveness and, more importantly, how board effectiveness can be improved. Our study adds to this growing area of literature by examining whether foreign institutional investors (denoted as FIIs), improve board effectiveness by influencing their monitoring activities.[13] Board monitoring by shareholders is important in reducing agency costs and linked to more effective decisions making by directors, ultimately on the performance of the firm.[14] Gillan and Starks (2003) offer a theoretical argument that a growth in FIIs' ownership should result in better monitoring and governance. In this paper, we empirically examine the link between FIIs' ownership and different dimensions of board monitoring.

[11] India is ranked 9th in the world at the end of 2016 in terms of market capitalization, 4th in terms of country weights in the MSCI Emerging Markets Index. Net investment by FIIs in the Indian equity market has grown from INR 440 billion (approximately US$9.6 billion) in 2003-04 to INR 1,102 billion (approximately US$18.01 billion) in 2014-15 (Source: Reserve Bank of India). Also, see "India is the jewel in the emerging market crown", *Financial Times*, May 31, 2015; "Faster growing India confirmed as most dynamic emerging market", *Financial Times*, May 31, 2016.

[12] Board powers are large and wide ranging. They include initiating and approving all major corporate decisions (e.g. major investment, financing, acquisition, divestiture, and liquidation decisions), hiring and firing CEOs, determining CEO and senior officer compensation, nominating (re-nominating) directors, and advising senior management.

[13] Schwartz-Ziv and Weisbach (2013) find that board time and energy are primarily concentrated on monitoring activities. Specifically, they find that approximately two-thirds of the issues that boards discuss are supervisory in nature, boards vote on only a single option in 99% of the issues discussed and disagree with the CEO only 2.5% of the time.

[14] Activist "outside" shareholders, particularly FIIs, are likely to perform arms-length monitoring to mitigate the expropriation by controlling shareholders, thereby benefiting minority shareholders (Huang and Zhu, 2015).

Despite convincing theoretical arguments, to the best of our knowledge, there is no empirical study that uses board level data investigating the link between FIIs' ownership and different facets of board monitoring. Further, the endogeneity problem is a major challenge in establishing a causal link between FIIs and board monitoring (Gillan and Starks, 2003).[15] In this study, we overcome this identification challenge by exploiting the 2007-08 financial crisis as an exogenous shock that significantly diminishes the ownership of FIIs in the Indian market.[16] India, an emerging market, is typically challenged by the "twin agency" problems of controlling corporate insiders and state ruler discretion (Stulz, 2005) .

The literature views that large outside shareholders, such as FIIs, can contribute in mitigating the problem of agency costs by demanding higher managerial performance (Claessens et al., 2002; Noe, 2002; Shleifer and Vishny, 1986, 1997). Consistent with this view, empirical studies by Ferreira and Matos (2008), Aggarwal et al. (2011) and Huang and Zhu (2015) suggest that FIIs improve firm-level corporate governance to limit the expropriation by controlling shareholders. However, what remains unanswered from these studies is how FIIs shape the governance of the firms they invest in, i.e. what are the specific channels through which FIIs improve firm-level governance. Our study attempts to address this void in the literature by associating exogenous changes in FIIs' ownership with variations in board monitoring.

The 2007-08 global financial crisis affected most of countries around the world and hence, provides an ideal opportunity for establishing link between FIIs' ownership and the qualities of board monitoring. For instance, Blanchard et al. (2010) and Fratzscher (2012) document that the 2007-08 crisis triggered an outflow of foreign capital from emerging markets to advanced economies. The financial crisis also resulted in a substantial decline of FIIs' ownership in India. For instance, net foreign portfolio investments decline by around US$39 billion in 2008-2009 fiscal year

[15] For example, it is argued that firms make changes in corporate governance practices to attract and retain FIIs (Kim et al., 2010). On the other hand, FIIs themselves play a major role in prompting change in firm-level corporate governance practices (Aggarwal et al., 2011).

[16] The financial crisis has been extensively used an exogenous shock by studies including Puri et al. (2011), Kovner (2012), Lins et al. (2013) and Buchanan et al. (2018), among others.

compared to previous fiscal year. This setting allows us to test whether the exogenous shock to FIIs' ownership causes any change in different features of board monitoring.

Our empirical investigation identifies seven different board level proxies that capture differing features of board monitoring. These characteristics include board size, board independence, board busyness, board diligence, network size, CEO power, and CEO pay level. Although these characteristics proxy board monitoring, identifying whether the high or low level of these proxies improves board monitoring effectiveness has been empirically challenging.[17] Consequently, we consider the effect of FIIs' ownership on these proxies that capture the board monitoring as an empirical question. For identification strategy, we use a matched sample of treatment and control firms (based on the FIIs' level of ownership prior to the onset of the 2007-08 financial crisis) and take account of other factors that affect board monitoring (see Section 4.4.3 for the identification strategy). As such, we address the endogeneity by employing a difference-in-differences (DiD) approach in which we compare the level of board monitoring before and after the crisis as a function of firms' FIIs' ownership.

1.3 Summary of findings and main contributions

In this section, we discuss the summary of the findings and main contributions of above discussed three empirical investigations.

1.4.1. Tax threat and disruptive market power of foreign portfolio investors

In our first empirical essay, we report three main findings. First, the examination of FIIs' trade-level data shows that there is a significant and economically material market withdrawal (outflows) by FIIs during the *MAT threat period*. We find that, on average, the withdrawal by FIIs translates into a daily decline of 0.309 basis points of market capitalization for an average equity, reflecting approximately an average of

[17] For example, on the one hand, small boards are often associated with better monitoring and firm performance (Bennedsen et al., 2008; Harris and Raviv, 2008; Jensen, 1993), on the other hand, large boards are also considered to be optimal under certain circumstances (Coles et al., 2008; Jackling and Johl, 2009; Raheja, 2005). Likewise, the empirical investigation on the influence of board independence, busy boards, board connections, and pay of CEO on firm performance has yielded mixed results.

Indian Rupees (INR) 7.27 million per firm per day.[18] We also find that FIIs' reaction is immediate, with substantial withdrawal taking place within the first seven trading days of the *MAT threat period*.

Second, our examination of the implications of the announcements and subsequent FIIs' trading indicates that the outflows during the *MAT threat period* increase stock market volatility, and have a detrimental effect on stock liquidity and returns. We find that both option-implied and realized stock volatility increases significantly during the *MAT threat period*. More importantly, we find a substantial rise in the volatility risk premium during the *MAT threat period,* suggesting a significant increase in the market risk premium. We also find that, on average, for a typically traded equity, a one basis point decline in the daily net equity trading by FIIs triggers, on average, a 180 basis points fall in turnover ratio and a 0.022 points increase in the stock illiquidity index.[19] As these results are based on daily data, they demonstrate a significant and material market effect of the FIIs' withdrawal.

Further, an event study around the tax-related announcements shows a significant stock market reaction. We find an excess cumulative abnormal stock return (CAR) of -6.53% for 20 days following the first announcement (MAT threat) for firms in the treatment group compared to firms in the control group. These results suggest that the prospect of changes in the tax policies triggers significant stock market reactions. Similarly, we run a long-short trading strategy test where we take a long position on firms highly affected (treatment group) and short position on firms least affected (control group) by the withdrawal. We find that on average the daily return for a typical equity declines by 18 basis points for the long, relative to a rise of 23 basis points for the short strategy. This suggests that FIIs' withdrawal during the *MAT threat period* has a depressing pricing effect on the stock market.

Finally, we find that the long-term effect of the threat lingers on even after the removal of the tax threat. We find no immediate and substantial increase in inflows in the *post-MAT threat period* compared to the abrupt and economically sizeable

[18] Approximately US$ 0.12 million per firm per day during the *MAT threat period*.

[19] Further, there is also an increase of 1.842 points in an alternative stock liquidity ratio where a higher value is associated with lower stock liquidity.

outflows observed after the MAT threat. In terms of size, the reversal of the MAT policy attracts, on average, a daily inflow of only 0.048 basis points of market capitalization per equity (around INR 1.08 million) compared to a daily outflow of 0.309 basis points after the MAT threat (around INR 7.27 million). We also find a subdued positive effect on stock returns in the *post-MAT threat period* as we document a comparatively lower CAR of 2.90% in the 20 days period for the treatment firms compared to the control firms.

Our first investigation contributes to different streams of literature. First, we develop the literature on FIIs' role in influencing policymaking in emerging markets (see Kerner, 2015). To the best of our knowledge, this is the first study to suggest a direct market-based channel through which FIIs can influence policymaking by effectively withdrawing investments from the host market. Our findings indicate that FIIs are willing to quickly withdraw from markets in response to policies that threaten to increase their costs.

Second, we add to a specific debate on whether tax subsidies are important for FIIs. Razin et al. (1998) argue that FIIs do not have to invest in costly information gathering because, being mobile investors, they can yield a real rate of return elsewhere which, at least in theory, is identical to the real rate of return obtained in the host market. However, domestic governments may also encounter political opposition in providing subsidies to FIIs. Though the political-economic equilibrium may be dictated by home pressure groups, it should also take account of FIIs' information gathering costs. Studies also document that the information asymmetry friction forces FIIs to become momentum investors without any due consideration to the fundamentals and privileged information (see Brennan and Cao, 1997; Griffin et al., 2004). Thus, the high cost of information acquisition may lead to the sub-optimal supply of foreign capital. However, by providing tax subsidies, this may reduce the costs associated with the information asymmetry problem. The issue of whether foreign capital inflows effectively receive any favourable tax treatment has not been fully explored in the literature (Razin et al. 1998). Our study fills this void by showing how FIIs react to a shock when the prevailing subsidies (no long-term capital gain taxes and exploitation of the double taxation treaty agreement, see Section 2.2) are threatened by the MAT provisions.

Third, the investigation also contributes to the stream of literature that discusses the implications of tax regimes on FIIs. Desai and Dharmapala (2009b, 2011), who examine the annual outbound investment from US, find that FIIs are sensitive to tax regimes. The analysis in this paper extends this literature by focusing on inbound FIIs' equity flows into a large emerging economy, whereby we not only examine the daily reaction of FIIs to potential changes in the tax policies but, more importantly, investigate how their withdrawal leads to potentially disruptive effects on the stock market.

Since the shock we use in this paper is directly related to measures aimed at curbing tax avoidance practices, our paper also interacts with a growing body of literature linking foreign investments and tax avoidance. Although there has been some evidence on the effect of tax avoidance on foreign direct investors (see Clausing, 2006; Egger et al., 2014; Rego, 2003), there is no empirical evidence exploring how a potential threat of changes in tax avoidance practices changes FIIs' trading activities.[20] The lack of systematic evidence on the effect of tax avoidance on FIIs could be because it is difficult to measure the influence of tax avoidance by using traditional measures. Empirically, capturing the effect of tax avoidance has been a major challenge in the literature. Studies use various measures, such as long-run effective tax rates, book-tax differences, unrecognized tax benefits, and tax shelters (Desai and Dharmapala, 2006, 2009a; Dyreng et al., 2008; Graham and Kim, 2009). However, these measures either do not fully capture tax avoidance (construct validity bias) and/or are endogenous in nature (Hanlon and Heitzman, 2010). Instead of using these endogenous proxies, the unexpected exogenous shock of the MAT threat allows us to more convincingly examine the causal links between the benefits of tax avoidance and FIIs' trading activities.

Finally, our paper also contributes to the controversial literature debating the potential destabilizing effect of FIIs' trading in emerging markets. A well-established strand of literature does not find any sound theoretical basis for why the increasing presence of FIIs may have any destabilizing effect on the local equity markets in

[20] Foreign investors engage in tax avoidance through various measures, such as transfer pricing and profit shifting (Bartelsman and Beetsma, 2003; Jacob, 1996; Klassen et al., 1993).

emerging countries (Bekaert and Harvey, 2000, 2003; Choe et al., 1999; Errunza, 2001; Stulz, 1999). The issue of whether the growing presence of FIIs only carries beneficial externalities or also possesses threats of market disruption is a matter of intense debate. Exploiting a credible shock-based experimental set-up and using granular transaction-based data, the results of our investigation show that, at least in the short term, the sudden withdrawal by FIIs seems to have a significant disruptive market impact. This suggests that although FIIs' presence may fetch significant beneficial effects in the long term, the market could also face undesirable consequences if the flows are not managed and retained by employing prudent policy tools.

1.4.2. Mimicking the insiders' trades by FIIs

After classifying insiders' trading into routine and opportunistic insiders' trading, following Cohen et al. (2012b) and using the granular trade-level data of FIIs in India, our study reports the following main findings.[21] First, to confirm the importance of classifying insider trades based on their sequence of their transactions for an emerging market, we examine the predictive ability of opportunistic and routine insiders' trading. Our analyses show that insiders' trades, particularly opportunistic buys, are a significant predictor of future returns. Both opportunistic and routine trades earn, on average, an incremental return of 243 basis points in the following month of the trade, which is much larger than the 158 basis points for the US as reported by Cohen et al. (2012b). Opportunistic buy trades alone earn an incremental return of 160 basis points in the following month of trade

We then set out to test our main mimicking hypothesis, which argues that given the informativeness of insiders' trades, particularly the opportunistic ones, FIIs are likely to follow the direction of these trades. We find results consistent with our hypothesis as FIIs' trades are positively related to opportunistic buy trades. Although, FIIs mimic these trades as early as within 15 days of the disclosure, the results are stronger for longer time periods (20 and 30 days after the disclosure). However, we do

[21] This method is gaining increasing acceptance in the insider trading literature, for example, Khan and Lu (2013), Jia et al. (2014), Reeb et al. (2014), and Cline et al. (2017) all follow this classification of insiders' trading. The classification strategy is discussed in detail in Section 3.3.

not find any relation between opportunistic sell and routine insider trades with FIIs' trading. Moreover, Schmidt (Forthcoming) finds that institutional investors pay most attention to the stocks in their portfolio rather than other stocks. We examine this in our context by examining who trades following the disclosure of insider trades by classifying FIIs into three categories: past, existing and new shareholders. Consistent with Schmidt (2018), we find that it is predominantly the current shareholders who trade following the disclosure of insider trades. While we find that some new shareholders also trade on the availability of this new information, we do not find any support for the mimicking hypothesis for past shareholders.

We address the endogeneity concern of our mimicking results in two ways. First, we examine reverse causality and test whether our results are driven by the opportunistic (routine) insiders' reaction to past FIIs' trades. We rule out this explanation as we do not find any relation between insiders' trading (both opportunistic and routine) and past FIIs' equity trading. Second, we conduct a difference-in-differences (DiD) analysis between a treatment and a control group before and after the disclosure of insiders' trades. We identify the treatment firms as those where both FIIs, and opportunistic and routine insiders trade, and the propensity score matched (PSM) control firms as those where only FIIs trade.[22] Our results show that compared to the control firms, FIIs' trading in the treatment firms is immediate and in the same direction as that of opportunistic insiders' buy trades, supporting the mimicking hypothesis.

Finally, we examine whether FIIs who mimic insiders' trade are able to earn significant abnormal returns. We undertake a calendar-time portfolio analysis and evaluate the risk-adjusted post-trade returns for four portfolios (based on the four classifications of the insiders' trade) by calculating raw returns, cumulative abnormal returns (CARs) and the Capital Asset Pricing Model (CAPM) based intercept (alpha) return.[23] Our results confirm that, on average, the portfolio focused on opportunistic

[22] We identify matched pairs of treatment and control groups using PSM and assume the event date (i.e. the reporting date of insiders' trade) to be the same for the firms in the treatment and control groups.

[23] In all the CAR measures, we use the MSCI India total return as the benchmark market return, sourced from Thomson Reuters' database.

buy trades earns a significantly higher return compared to routine buy trades. However, we do not find any significant differences in returns for a portfolio based on opportunistic and routine sell trades. Further, our results also show that the CARs based on opportunistic buy trades of the treatment group are significantly higher than those of the control group. Combined, these results suggest that FIIs who mimic opportunistic buy trades can earn substantially higher returns compared to FIIs who follow other insider trades.

We perform a battery of robustness tests to confirm the mimicking hypothesis and return-based findings. First, to re-examine the mimicking hypothesis, we rerun our analysis using Ali and Hirshleifer (2017) definition of opportunistic trading, which is based on the profitability of insiders' past pre-quarterly earnings announcement (QEA) trades. We find that our results based on this alternative measure are qualitatively similar to those using the Cohen et al. (2012b) measure. Second, the results of the mimicking hypothesis and the abnormal returns of the mimickers are robust to the use of a trade-level definition of opportunistic and routine insiders' trade and a more stringent definition of opportunistic and routine insiders' trades. Third, the mimicking hypothesis also holds when we employ the changes in FIIs' quarterly firm ownership (holdings) data as an alternative definition of FIIs' trading. Finally, the results on the mimicking hypothesis also stand when we address the possibility of window dressing and portfolio pumping by FIIs.

Our study makes two key contributions to the literature. First, we add to the literature on insiders' trading in emerging markets. To the best of our knowledge, this is the first study to segregate the information content of insider trading in an emerging market context. We show that the information content of opportunistic trades is likely to be superior in emerging markets compared to similar trades in more developed markets. Second, our study also contributes to the literature which focuses on outsiders' responses to insiders' trades (Bettis et al., 1997; Chang and Suk, 1998; Cornell and Sirri, 1992). Although Cohen et al. (2012b) provide anecdotal evidence that institutional investors may follow past opportunistic insiders' trades, we provide strong empirical evidence of informationally disadvantaged FIIs closely following trades made by insiders. Our study further extends the literature by showing that FIIs can earn superior investment returns by mimicking the insiders' trades.

1.4.3. FIIs and board monitoring

The results of our third investigation indicate that a change in FIIs' ownership triggers changes in the different aspects of board monitoring. Specifically, our results present the following findings. First, the negative relation between FIIs and size of the board supports the view that increasing interest of FIIs can influence the size of the board to shrink the cost of monitoring associated with the larger board (Raheja, 2005). Second, though conventional wisdom suggests that independent directors (IDs) improve board monitoring as they reduce agency costs, we find a negative influence of FIIs on board independence. Third, we find that FIIs reduce board in the firm they invest in, a finding consistent with the argument that busyness of boards has an adverse effect on the quality of board's monitoring role (Core et al., 1999; Shivdasani and Yermack, 1999).

Fourth, we find evidence of a positive influence of FIIs on board diligence, reflecting FIIs' crucial role in enhancing the monitoring intensity of the board and CEO (Hermalin, 2005; Kolev et al., 2017). Fifth, we show that in the firms FIIs invest in there is a reduction in the board's network size (the number of outside firms with whom the firm shares common directors). As large board network size is associated with lower monitoring and increased agency problems (Bizjak et al., 2009; Fich and Shivdasani, 2006; Fich and White, 2003; Larcker et al., 2005), our results suggest that FIIs play an important role in the improvement of board monitoring by optimizing the network size of the board. Finally, we find that the pressure of FIIs in Indian firms reduces both the power as well as pay/incentives of the CEO, consistent with the theoretical prediction of the literature (Dah and Frye, 2017; Hermalin and Weisbach, 1998). Overall, our empirical evidence suggests that FIIs have a significant influence on the firm monitoring by improving the quality of the board's monitoring role. These findings are robust to a series of additional checks.

Our study contributes to different strands of literature. We extend the literature that links FIIs' ownership and board monitoring of firms (Gillan and Starks (2003) Aggarwal et al., 2011; Huang and Zhu (2015). Gillan and Starks (2003) offer a theoretical intuition that growth in FIIs' ownership should result in better monitoring and governance. Huang and Zhu (2015) provide evidence of how FIIs' involvement in corporate governance in China promotes the rule of market principles in corporate

voting and governance practices. They find that FIIs achieve shorter reform processes in split-share restructure reforms and that FIIs are less prone to political pressure, as firms with FIIs provide the highest compensation ratio offered by non-tradeable shareholders to tradeable shareholders. Similarly, other studies have also noted that FIIs improve the overall *Governance Index,* as in Aggarwal et al. (2011). Aggarwal et al. (2011) note that though the Governance Index can capture the overall firm level governance, it may not capture specific aspects, such as board monitoring, that really matter to corporate governance. These studies do not directly investigate the link between FII ownership and effectiveness of board monitoring. As such, our study is different in the sense that we show how firm-level causality runs from FIIs' ownership to firm-level board monitoring. To the best of our knowledge this is the first study that credibly answers the question: whether FIIs play any influential role in improving monitoring at the board level. The results of our study show that FIIs are effective monitors and are crucial in improving board effectiveness.

1.4 Overall conclusion

Overall, the thesis sheds light on the short-term and long-term impact of FIIs in emerging markets. In short term, we find that FIIs react immediately to both market-level events such as government announcements that increase tax burden and firm-level events such as trading by opportunistic insiders. We find that while FIIs react negatively to cost-increasing policy announcements, FIIs trade based on public disclosure of information-rich trading by opportunistic insiders. In long term, we find that FIIs' power to withdraw from the market in response to policy announcements catalyses policy change in emerging market. We also find that FIIs' ownership in firms have long-term positive impact on the level of board monitoring and it bridges the relationship between board monitoring and firm performance.

1.5 Thesis structure

The rest of this thesis is organized as follows. Chapter Two discusses the first empirical investigation that examines the effect of tax threat on foreign portfolio investors. Chapter Three discusses the second empirical investigation that examines whether foreign institutional investors mimic the insiders' trades in emerging market. Chapter

Four discusses the third empirical investigation that examines whether foreign institutional investors improve board monitoring. Chapter Five brings the concluding remarks.

Chapter 2. Tax threat and the disruptive power of foreign portfolio investors

2.1 Brief introduction

Recent studies suggest that FIIs can indirectly influence the host government policies if they can influence the shareholders and managers, who are in position to lobby the domestic regulators, to alter the policies that suits the investment preferences of FIIs (Durnev et al., 2015; Kerner, 2015). In this study, we argue that FIIs may possess a direct market-based power that may influence the host government policies and they could derive this power through market withdrawal. The market implications of such explicit withdrawal could potentially exert pressure on host government regulators to make changes to their domestic policies.

We examine a threat on additional tax liability known as Minimum Alternate Tax (MAT), discussed in detail in Section 2.2, on FIIs. We investigate a period of five months, termed as MAT threat period, between two announcements related to MAT and address three key issues: First, what is the trading behaviour (size and direction) of FIIs during the MAT threat period? Second, what are the implications of FIIs' trading on stock volatility, liquidity and returns? Finally, how do FIIs react in the post MAT threat period when the tax threat disappears?

We make several contributions. First, to the best of our knowledge, this is the first study to provide a suggestive evidence that there is a direct market-based channel through which FIIs may influence policymaking by effectively withdrawing investments from the host market. The empirical work herein contributes to the findings of Kerner (2015) and Durnev et al. (2015). Second, we add to the literature that examines the importance of tax subsidy for foreign investors (Razin et al., 1998) and show that when tax subsidy is threatened, FIIs react negatively leading to disruptive market effects. Third, we also add to the literature on the implications of tax regime (Desai and Dharmapala, 2009b, 2011). While prior studies mostly focus on fund flows from developed market in response to changes in tax regime, we focus on inbound FIIs' fund flows into an emerging market and examine a daily reaction to the changes in tax policies and the impact of such flows. Fourth, our study also interacts

with the literature related to foreign investments and tax avoidance (Clausing, 2006; Rego, 2003). The use of exogenous event allows us to alleviate the concern of use of appropriate measure of tax avoidance. Finally, we also contribute to the debate whether foreign investments have destabilising effect on the emerging markets (Bekaert and Harvey, 2000, 2003; Errunza, 2001; Gelos and Wei, 2005; Kim and Wei, 2002; Stulz, 1999).

In general, we find evidence of significant market withdrawal by FIIs in response to the tax threat imposed by government on the income earned by FIIs. We also find that this withdrawal had a disruptive effect on the stock market. Interestingly, we find that FIIs do not enter into the market with same intensity after the removal of the tax threat compared to the abrupt outflow after the tax threat.

A more detailed discussion of the questions, findings and contributions is in Sections 1.3.1 and Section 1.4.1. The rest of the paper is organized as follows. Section 2.2 provides a background and key dates related to the MAT announcements. A review of literature and a model of fund flow related to this empirical investigation is presented in Section 2.3. Section 2.4 explains the trading data, variables and identification strategy, followed by a discussion of the empirical results of FIIs' reaction in Section 2.5. Section 2.6 analyses the effect of FIIs' market withdrawal and the announcements, and Section 2.7 examines FIIs' re-entry in the market following the elimination of the MAT threat. Finally, Section 2.8 concludes this chapter.

2.2 Institutional background and minimum alternate tax (MAT)

As discussed in Section 1.1, post-1991 period marked a dramatic shift in institutional framework in India. FIIs' investments leapfrogged from minuscule levels to a substantially high level making it a major liquidity provider in the Indian market. As such, SEBI institutionalized "FII Regulations" in 1995 allowing investors incorporated outside India to invest in listed companies in India. The restrictions were further lifted in 1996 allowing them to invest in unlisted companies. Under the SEBI's FII Regulation 1995, foreign investment in India could be made by FIIs, sub-accounts of FIIs, and Qualified Foreign Investors (QFIs). The regulation defined FIIs as investors such as overseas pension funds, mutual fund, investment trusts, (re)insurance company, international or multilateral agency, foreign government, sovereign

government funds, overseas asset management company, investment manager, bank portfolio manager, trustee, university funds or charitable organizations. Sub-account essentially meant a person resident outside India, on whose behalf FIIs propose to invest. QFIs were defined as investors who is resident of a country that is member of Financial Action Task Force (FATF) or a member of a group which is a member of FATF, or signatory to International Organization of Securities Commissions (IOSCO)'s Multilateral Memorandum of Understanding. Until 2004, FIIs in India had to face multiple bureaucratic hurdles and procedures before they could obtain license to invest in India. For instance, FIIs needed to register with SEBI as well as obtain approval from Reserve Bank of India under Foreign Exchange Regulation Act (FERA) to transact in Indian securities. In 2004, FIIs dual approval process was changed to a single approval process which substantially reduced the registration hurdles. Subsequently several regulatory changes were made in order to attract more FIIs.

With a view to harmonize various FIIs' investment routes and to establish a unified regulatory framework, a new Regulation came into effect in 2014. Under the regulations, all the different investment routes were clubbed into one investment: namely "Foreign Portfolio Investments (FPIs)". FPIs were further classified into three categories: Category I, Category II and Category III. For details see Section 1.1. Each FPIs are restricted to invest up to 10 percent of the issued equity capital and on aggregate the investment is capped at 24 percent. FPIs cannot invest in unlisted securities (they are only allowed to sell unlisted securities that they had held previously). The regulation also ensured the FPIs investment in equities and debt are monitored daily through the exchanges and depositories.

In a bid to attract foreign investment in India, FIIs were provided with tax subsidies as they are exempt from paying the long-term capital gains tax and only pay a short-term capital gains tax rate of 15%. However, most FIIs in India took advantage of the double-taxation treaty agreement (DTTA) with countries such as Mauritius, Singapore and Hong Kong, to avoid any Indian tax liability. For instance, capital gains taxes were exempt in Mauritius, which encouraged FIIs to "treaty shop" and establish

a holding company in Mauritius for investment in India.[24] This has resulted in the general avoidance of capital gains taxation in India by FIIs.

The issue of tax avoidance by foreign investors began to concern the Indian government when a Dutch subsidiary of Vodafone, a UK-based multinational telecom company, purchased an indirect but controlling stake of 67% in Hutchison Essar Ltd (HEL), who held and operated a telecom license in India. The deal was processed through acquisition of stocks of a Cayman Islands' company from a subsidiary of Hutchison Telecommunications International Limited (HTIL), the latter also located in the Cayman Islands. HTIL, purchased by Vodafone, owned an indirect interest in HEL through several tiers of Mauritian and Indian companies. The Indian government claimed that the transaction was liable to be taxed, around US$ 2.5 billion, since the transaction involved the purchase of assets based in India. Vodafone argued that since the deal was between two foreign entities in a foreign jurisdiction, the Indian government had no right to impose capital gains tax. Though the Supreme Court ruled in favour of Vodafone, in 2012 the Indian government changed its Income Tax Act retrospectively to ensure that such offshore share transfers are liable to pay a domestic capital gains tax if at least 50% of the assets held by target foreign companies are based in India. The retrospective change in tax law also affected other transactions involving the indirect transfer of assets between international companies and Indian subsidiaries, such as the Idea Cellular-AT&T and General Electric-Genpact deal.

With the objective of curbing these tax avoidance practices of FIIs, the Indian government introduced a new tax (MAT) on the income of FIIs. MAT is an alternate tax mechanism to ensure "zero-tax companies" pay at least 18.5% tax on net profit, which would include FIIs. It was initially introduced in India in 1987 by the Finance Act of 1987, withdrawn by Finance Act, 1990 and reintroduced again by Finance Act, 1996 with effect from April 1, 1997. Further, MAT was primarily intended for companies having permanent residence in India.[25] For our purpose, Table 2-1 shows

[24] The annual report for 2015/16, published by the Securities Exchange Board of India (SEBI), shows foreign portfolio investments from Mauritius, Singapore and Luxembourg had the highest value of assets under custody during 2015/16 after the US.

[25] Section 5.1.25 of "Report on Applicability of Minimum Alternate Tax (MAT) on FIIs / FPIs for the period prior to 01.04.2015" notes "..., the Budget speech of the Finance Minister in 1987 makes an express reference to 'domestic companies'".

the key dates of the introduction of MAT for FIIs investing in India.

Although the Indian government proposed to impose MAT on FPIs in 2010, the Authority for Advance Rulings (AAR) ruled that MAT was not applicable to companies having no permanent establishment in India thus effectively excluding FPIs from any MAT liability. Subsequently, in 2012 the AAR reversed its judgement and ruled that MAT provisions override the DTTA and thus would be applicable to FPIs. Based on the 2012 ruling, the Indian Tax Department (ITD), from December 2014 started their assessments and later raised tax notices to selected prominent FPIs asking for payment of the new MAT liability (Committee on Direct Tax Matters, 2015).

Table 2-1: Key dates for application of Minimum Alternate Tax (MAT) to FIIs

This table presents the relevant dates for application of MAT to FIIs.

Dates	Events	Comments
July 23, 2010	Authority for Advance Rulings (AAR) ruled that MAT was not applicable to companies having no permanent establishment in India.	FIIs were not liable to pay MAT in India.
August 14, 2012	AAR overruled its previous decision on the applicability of MAT to FIIs.	MAT provisions override DTTA and hence FIIs are liable to pay MAT. The ruling did not invoke concerns as the decision was challenged in the Supreme Court.
February 28, 2015	The announcement in budget session that MAT would not be imposed w.e.f. April 1, 2015.	Provided relief to FIIs on the applicability of MAT, however, raised the question whether MAT would be imposed retrospectively.
April 1, 2015	The effective date of not imposing MAT on prospective transactions.	Provided prospective clarity but made the MAT threat on retrospective transactions imminent.
April 5, 2015	Tax demands intensified by Indian government valued at around US$ 6.4 billion.	Further increased the threat to FIIs of the new tax liability.
September 1, 2015	MAT not to be applicable retrospectively.	Eliminated the MAT threat.

https://www.finmin.nic.in/sites/default/files/ReportonApplicabilityofMinimumAlternateTax%20onFIIsFPIs.pdf

However, on February 28, 2015, the Indian government made an unexpected announcement that MAT would not be imposed on the transactions of foreign companies (including FPIs) having no permanent establishment or place of business in India on transactions after April 1, 2015. While the announcement clarified that MAT would not be applicable on transactions after the effective date of April 1, 2015, it only provided temporary relief as towards the end of March and early April 2015, the Indian government surprisingly unveiled plans to raise hefty US$ 6.4 billion in the form of MAT from the FPIs. The Indian government started sending notices to several FPIs demanding MAT for preceding years, arguing that MAT would be applicable for all FPIs' income (including capital gains) earned before the effective date and for other income (excluding capital gains) after the effective date.[26] This sudden and significant demand of MAT on retrospecitive transactions created concern among FPIs and at least five FPIs approached the High Court challenging the legality of the retrospective tax liability.[27]

To address the concerns of the FPIs, a high-level committee was formed by the Indian government to provide recommendations on the issue of retrospective MAT for FPIs.[28] Following the recommendations of the committee, the government made another announcement on September 1, 2015 that MAT would not be imposed on FPIs retrospectively.

As there are several key dates in our timeline, it is important to identify the period that generated a substantial exogenous shock to FPIs. For our empirical investigations, we consider April 1, 2015 as the key date, which is not only the beginning of financial fiscal year, but also the time when FPIs were threatened with

[26] "100 FIIs get tax notices for $6bn, say it's retrospective", *The Economic Times*, April 6, 2015; "The long arm of India's tax authorities" *The Financial Times,* April 14, 2015; "India on collision course with investor over $6.4 billion tax target", *Financial Times*, April 15, 2015; "How to end India's Tax Terrorism", *Bloomberg*, April 17, 2015 and, "SEBI backs foreign portfolio investors, raises concern over impact of MAT", *The Economic Times*, May 29, 2015.

[27] For instance, Aberdeen Asset Management filed a petition in Mumbai's High Court to challenge the Tax claim by ITD.

[28] The committee consisted of three core members who conducted various rounds of consultation with major groups that also represented the interests of FPIs, such as KPMG, Deloitte, Ernst & Young, PricewaterhouseCoopers, Federation of Indian Chambers of Commerce and Industry (FICCI), Confederation of Indian Industry (CII), and Progress Harmony and Development Chamber of Commerce and Industry (PHDCCI).

sudden notices of hefty retrospective tax demands. As such, the period between April 1, 2015 (the effective date) and September 1, 2015 (the clarification announcement date) provides us with a *MAT threat period* that was characteristed with significant uncertainty for FPIs in relation to a proposed change in the tax regime.

We do not consider February 28, 2015 as the main event date as the announcement only made it clear that FPIs would not be liable to pay MAT on transactions after April 1, 2015 (beginning of financial fiscal year) but remained silent whether MAT would be applicable on retrospective transactions conducted prior to April 1, 2015. Also, the ITD took a view that the government's clarification on the applicability of MAT did not apply to earlier years (Committee on Direct Tax Matters, 2015). However, towards the end of March, the Indian government began to demand additional tax by sending notices to select FPIs. It was only towards the end of March/beginning of April that ITD intensified its tax demands. Nevertheless, we conduct a robustness tests using February 28, 2015 as the main event date. We also consider other important dates in the MAT timeline in our robustness tests.

2.3 Review of literature

This section discusses literature and a theoretical model that relates to the empirical investigation.

2.3.1 Policy uncertainty and FIIs' trading behaviour

Literature offer various economic explanations for trading behaviour of FIIs in emerging markets, however, one of the most dominated economic explanation relates to the information asymmetry (Chan et al., 2005; Ferriera et al., 2017; Leuz et al., 2008). This school of thought argues that FIIs earn lower returns on their investments as they have less information about the local market in comparison to the local investors such as domestic investors. Froot et al., (2001) suggest that as FIIs are at information disadvantage they seek information about future returns of a stock from their past returns. This phenomenon is known as *feedback trading* or *return chasing behaviour.* The information asymmetry is also blamed for the *home-bias,* which is a tendency of FIIs to invest more in their home country rather than in foreign/emerging markets where the returns are higher (French and Poterba, 1993; Lewis, 1999). Studies

also suggest that the presence of information asymmetry leads to higher market integration between foreign and domestic markets due to increased correlation between FIIs equity investment and local stock returns (Brennan and Cao, 1997; Brennan et al., 2005; Richards, 2005).

On the other hand, there are also evidence of superior returns earned by FIIs compared to local investors in emerging markets (Grinblatt and Keloharju, 2000; Seasholes, 2000; Froot et al., 2001; Froot and Ramodarai, 2008). This result supports the global private information theory forwarded by Albuquerque et al. (2009) who argue that FIIs can enjoy superior information advantage at times due to their access to superior global information. These conflicting evidences suggest that information asymmetry theory, although informative, may be incomplete to explain the trading behaviour of FIIs in emerging markets. There is burgeoning literature which argue that political risk such as uncertainty about government policies is another significant driver of FIIs' investments. Stulz (2005) notes that one of the implicit barriers to international investments, among other factors, is agency problems stemming from the possibility of expropriation by the host government, particularly in emerging markets. Governments can use their power to expropriate FIIs to suit their own private or political welfare through actions such as a change in government policies (Stulz, 2005).

Bond and Goldstein (2015) and Pastor and Veronesi (2012) note that prices on stock markets are affected by the uncertainty about government policy. Brogaard and Detzel (2015) also find that the uncertainty related to the economic environment is an important risk factor for equity pricing. These evidences suggest that the information extracted by FIIs from the past stock returns do not capture the information about the uncertainty related to government policies. It is important to appreciate the role of policy uncertainty on the investment decision by FIIs.

There are few established literatures that broadly relates the importance of policy uncertainty and foreign investments. Rodrik (1991) argues that policy reforms can backfire when such reforms induce doubts as to the survival of private foreign investments. Rodrik argues that policy uncertainty acts as a tax on investments as the

foreign investors hold back on their investments until the political uncertainty is resolved.

The theorical prediction of Rodrik (1991) are supported by the empirical evidence provided by Wei (2000), Gelos and Wei (2005), and Daude and Stein (2007). Wei (2000) show that increase in tax rate and/or corruption in host countries reduces the inward foreign investments. Such is the effect that an increase in corruption of Singapore to the level of Mexico would have same negative effect on foreign investments as raising the tax rate by fifty percentage points. Gelos and Wei (2005) examines the effect of country transparency on the behaviour of foreign institutional investors' funds. They find that foreign institutional investors tend hold more assets in more transparent markets, which is measured using government opacity and corporate opacity. In economic terms, they calculate that Venezuela could achieve a boost of 1.4 percentage points in the portfolio weights if its transparency is increased to the level of Singapore. Daude and Stein (2007) examines the foreign investments around the world and find that institutional aspects such as unpredictability of laws, regulations and policies, regulatory burden, government stability and lack of commitment play major role in discouraging foreign investments. Economically, they find that a one standard deviation increase in quality of regulations can increase foreign investment by two-fold.

Similar stream of literature also examines the implication of tax regimes on FIIs. Desai and Dharmapala (2009b, 2011) find that FIIs are sensitive to tax regimes and they reallocate their portfolio towards equities in tax-favoured countries. Desai and Dharmapala (2009b) analyse the worldwide corporate tax regime employed by the US and find that decrease in a foreign country's corporate tax rate increases the FIIs' holdings of US equity. Similarly, Desai and Dharmapala (2011) investigate the provision related to a reduction in dividend taxes in the Jobs and Growth Tax Relief Reconciliation Act (JGTRRA) in the US that was also extended towards the dividend received from companies located in countries that have a tax treaty with the US. They find substantial portfolio reallocation by US investors towards tax treaty countries compared to non-tax treaty countries. In a similar vein, Daude and Fratzscher (2008) and Kerner (2015) suggest that FIIs are sensitive to the tax policies as well as the risk

of expropriation of the host country, and they suggest that FIIs would quickly move out of the market if the policies are not conducive to their investment strategies.

Policies related to tax subsidy also seems to play major role in influencing the decision of FIIs to invest. This is particularly the case for emerging markets, which are characterized by asymmetric information problems where local investors are better or earlier informed about the prospect of domestic investments' returns. Razin et al. (1998) suggest that FIIs do not have to invest in costly information gathering because, being mobile investors, they can yield a real rate of return elsewhere which, at least in theory, is identical to the real rate of return obtained in the host market.

Extrapolating from this literature would suggest that favourable country-level policies attract FIIs in emerging markets (Abdioglu et al., 2013; Aggarwal et al., 2005; Leuz et al., 2009). As such, emerging markets draw these investors by amending their policies to better suit their investment preferences and provide low cost and high return investment opportunities. However, Kerner (2015) argues that FIIs also have the power to influence the policies of the host government. The extent of this ability depends on FIIs' ability to influence the managers and other shareholders of the firms they invest in, who, in turn, pressurize domestic policymakers. Durnev et al. (2015) analyses the political economy explanation for the choice of form of foreign investments (foreign direct investment or portfolio investments) and find that FIIs owned firms have comparative advantage in lobbying the government for policies conducive to their investments such as lower level of indirect taxes and preferential level of indirect taxes.

2.3.2 A model of cost of barriers of investing in emerging markets

In this section, we discuss a theoretical framework that highlights the role of the tax burden, one of the costs/barriers to investing in emerging markets on the trading behaviour of FIIs. This framework is used to examine the first empirical investigation, specifically first and third research question.

The framework we follow models the severity of barriers to international investments in emerging economies (see Bacchetta and Van Wincoop, 2000). It

demonstrates how the dynamics of capital flows in emerging markets change following gradual liberalization reforms (such as reduction in taxes) initiated by the host government. In our model, we assume that FIIs choose to allocate their wealth, *W*, between the Indian market *(IND)* and other, *N*, identical countries. Thus, the total number of markets invested is *N+1*. Period *t* returns on investments in other countries n_i *(N=*$\sum_{i=1}^{N} n_i$*)* are denoted by $r_{n_i\,t} \sim N(\bar{\mu}_N, \sigma_N^2)$. Let period *t* returns on *IND* equities be $\mu_{IND,t} \sim N(\mu_{IND}, \sigma_{IND}^2)$. For foreign investors, the return on *IND* equities is subject to an income tax, $\tau_{IND,t}$ translating into net return of:

$$r_{IND,t} = \mu_{IND,t} - \tau_{IND,t} \tag{2-1}$$

In Equation (2-1), $\tau_{IND,t}$ denotes the general applicable taxes on investments, such as short-term capital gains taxes. Further, we assume that the returns are uncorrelated across countries and $\sigma_{IND}^2 = \sigma_N^2$. We also assume that investors have an exponential utility function $U(C) = e^{-\theta C}$ where consumption *C* is the portfolio return, i.e. $R_t \times W$, and θ is the degree of risk preference ($\theta > 0$). Thus, foreign investors choose portfolio allocations to maximize period *t* utility, which is a function of the mean-variance trade-off:

$$max_{\alpha_{nt}} E(R_t) - \frac{\gamma}{2} var(R_t) \tag{2-2}$$

where $n \in [1, N+1]$, India is the *(N+1)st* equity market, α_{nt} is the weight of country n_i in the portfolios (with $\sum_{n=1}^{N+1} \alpha_{n_i\,t} = 1$), $\gamma = \theta W$, and R_t is the portfolio returns given by:

$$R_t = \sum_{n=1}^{N} \alpha_{n_i\,t} . r_{n_i\,t} + \alpha_{N+1,t} . r_{IND,t} \tag{2-3}$$

Next, if the average expected return in other countries is $\bar{r}_t = \sum_{n=1}^{N} \bar{r}_{n_i t}/N$ and the expected return on the *IND* is $\bar{r}_{IND,t}$, the portfolio weight in the Indian market (i.e. *(N+1)st* market) by foreign investors is, thus, given by:

$$\alpha_{N+1,t} = \frac{1}{N+1} + \frac{\bar{r}_{IND,t} - \left[\frac{\bar{r}_{IND,t} + N\bar{r}_t}{N+1}\right]}{\gamma\sigma^2} \tag{2-4}$$

Following the arguments by Bacchetta and Van Wincoop (2000) and Edison and Warnock (2008), Equation (2-4) suggests that an increase in $\tau_{IND,t}$ will lead foreign investors to reduce the portfolio weight in the Indian equity market. In our case, we assume $\varphi_{IND,t}$ to be the threat of expected additional tax due to the MAT announcement, where MAT, $\varphi_{IND,t}$ increased from $\varphi_{IND,t} = 0$ to $\varphi_{IND,t} = \bar{\varphi}_{IND,t}$. After the effective date of the *MAT threat period*, the portfolio weight in the Indian equity market (i.e. *(N+1)st* market*)* by FIIs, now denoted as $\hat{\alpha}_{N+1,t}$, is shown in Equation (2-5):

$$\hat{\alpha}_{N+1,t} = \frac{1}{N+1} + \frac{(\bar{r}_{IND,t} - \bar{\varphi}_{IND,t}) - \left[\frac{(\bar{r}_{IND,t} - \bar{\varphi}_{IND,t}) + N\bar{r}_t}{N+1}\right]}{\gamma\sigma^2} \qquad (2\text{-}5)$$

Equation (2-5) suggests that an increase in $\varphi_{IND,t}$ from 0 to $\bar{\varphi}_{IND,t}$ after the MAT implementation should result in a reduction of portfolio weight in the Indian equity market. Subtracting Equation (2-5) from Equation (2-4) will give us the difference in portfolio allocation in the Indian market after the introduction of additional MAT liability:

$$\alpha_{N+1,t} - \hat{\alpha}_{N+1,t} = \bar{\varphi}_{IND,t}\left(\frac{N}{\gamma\sigma^2}\right) \qquad (2\text{-}6)$$

Thus, the difference in portfolio allocation before and after the tax threat is attributable to the change in the potential MAT liability $\bar{\varphi}_{IND,t}$. Based on the prediction of the theoretical framework, we would expect the net portfolio inflow to fall as a response to the potential retrospective increase in tax liability($\bar{\varphi}_{IND,t}$). This could be further exacerbated by the prevalence of incomplete information, as Bacchetta and Van Wincoop (2000) argue that investors may not have immediate full information about the announced reforms in emerging markets. This suggests that when uncertainties about the extent of the reforms and their implementation are high, it should have a higher negative effect on the foreign portfolio inflows and encourage outflows. Similarly, the same theoretical framework would also suggest that the FIIs' portfolio flow should increase following the removal of a potential MAT liability. The removal of $\bar{\varphi}_{IND,t}$ would bring the portfolio weight back to the previous level. Thus, the portfolio inflows should increase, or the level of outflow should fall after the

eradication of the threat to introduce retrospective MAT liability for FIIs.

2.4 Data sources, variables and identification strategy

We begin this section with a discussion on the sources of data and summary figures, followed by an explanation of our identification strategy.

2.4.1 Data sources and summary figures

This study uses the trading level data of FIIs obtained from the Securities Exchange Board of Indian (SEBI) endorsed National Securities Depository Limited (NSDL) database.[29] The database contains details of all the trading conducted by FIIs since January 1, 2003, which includes each transaction identification, scrip name, ISIN code, transaction date, transaction type, the exchange traded, traded rate, quantity, value, and instrument types. 99.45% of all FIIs transactions are conducted on the National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) and 99.36% of all traded securities are equities.[30] Our analysis is based on the purchase and sale of equities on the NSE and BSE covering 99.34% of all FIIs' transactions. Since the MAT-related threat was from April 1, 2015 to August 31, 2015, our initial sample period is from January 1, 2015 to August 31, 2015.[31] For the stock return event studies, we source the daily stock returns data from the Prowess database maintained by the Centre for Monitoring Indian Economy (CMIE) and use the MSCI India Index return sourced from Thomson Reuters.

[29] Unfortunately, the SEBI does not provide the same trading data for domestic portfolio investors.

[30] Around 25% of transactions are conducted at BSE and rest in NSE. However, around 60% of the firms that FIIs trade are listed in BSE and rest in NSE.

[31] The sample period to analyse the impact of the second announcement on September 1, 2015 that reversed the MAT threat is from April 1, 2015 to December 31, 2015.

Figure 2-1: Month-wise FIIs' net equity trading in 2015 (in million INR)

This figure shows the monthly value of net equity trading value by all FIIs during 2015.

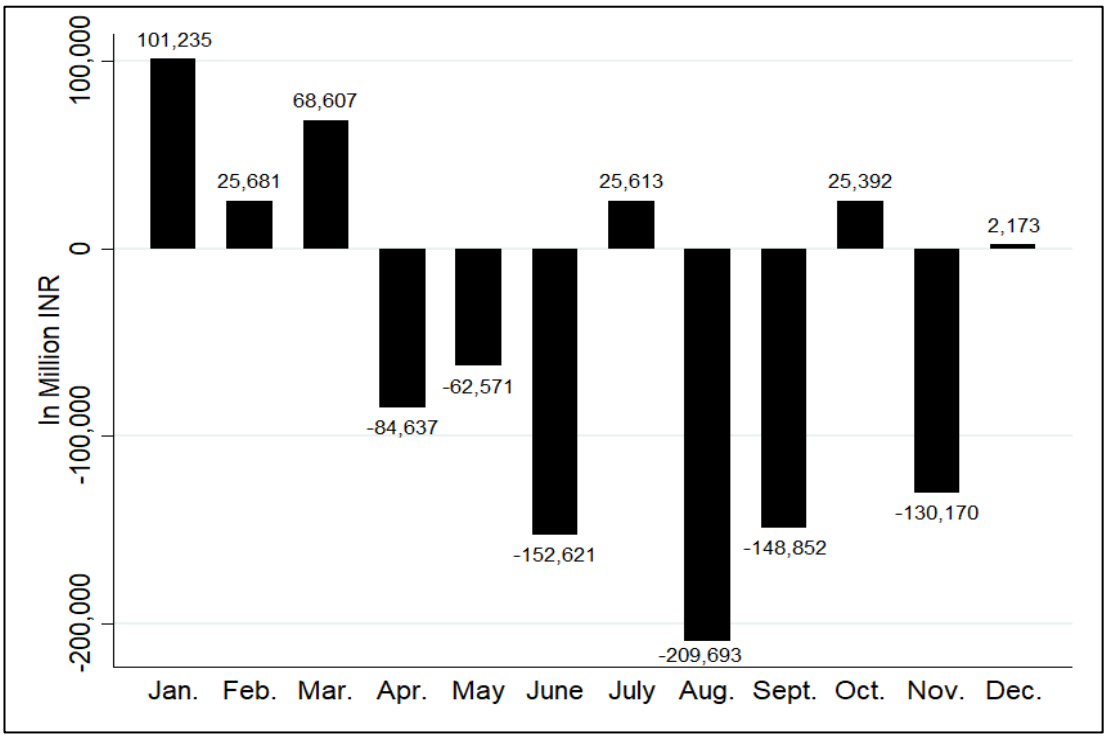


Figure 2-1 shows the monthly total net equity trading (i.e. purchase – sale, in million INR) of all listed Indian equities traded by all FIIs during the year 2015. These figures are winsorized at the 1st and 99th percentile to limit the presence of any extreme outliers in the transaction. Total net equity trading by FIIs for the first three months witnessed a positive inflow of around INR 196 billion (US$ 3.10 billion). However, immediately after the effective MAT date of April 1, 2015, we witness a series of outflows until September. Although transactions increased briefly during July, the transaction value of around INR 25.5 billion is less than half of the transaction value observed during March 2015. The total net equity outflow during the *MAT threat period* is approximately INR 484 billion (US$ 7.65 billion).

2.4.2 Variables

2.4.2.1 FIIs' trading variable

Our main dependent variable is FIIs' daily net equity trading for each equity. Following Froot et al. (2001), Bekaert and Harvey (2002), and Richards (2005), we

define *Net equity trading* (in basis points) as:

$$NET_{it} = \frac{\sum(Quantity_{i,t} \times Price_{i,t})}{MCap_{i,t-1}} \quad (2\text{-}7)$$

In Equation (2-7), $\sum(Quantity_{i,t} \times Price_{i,t})$ is the net equity traded on trading day *t* for equity *i*. The term $Quantity_{i,t}$ is the number of equities *i* purchased/sold on date *t* at $price_{i,t}$ (positive figure for purchase and negative for sale). $MCap_{i,t-1}$ is the previous day's market capitalization for equity *i* sourced from the Prowess database.

2.4.2.2 Control variables

In line with empirical studies on foreign portfolio trading, we also include several control variables in the multivariate regression examinations that could potentially affect FIIs' NET_{it}. Brennan and Cao (1997) argue that investors tend to purchase foreign assets in periods when the return on foreign assets is high and to sell when the return is low. Thus, empirical evidence suggests a positive relationship between net foreign flows and lagged stock returns. We control for this effect at the firm level by including the previous day's return of individual firms that FIIs trade on a particular day on the NSE and/or BSE (*Stock return*). We also control for a set of variables jointly referred to as pull factors, i.e. home characteristics that attract foreign inflows. Griffin et al. (2004) suggest that equity flow in the host country increases with the return of the host country's stock market. We control for host market return by including the previous day's average return on the NSE and BSE index *(Market return).* Further, Ülkü (2015) documents that the riskiness of the host market, such as volatility of local returns, also influences foreign investment. We include the daily standard deviation calculated using the previous 90 days' return on BSE or NSE *(Market volatility)* as a proxy for host market riskiness. Studies also note that equity flows into a foreign market are positively related to exchange rate appreciation (Hau and Rey, 2006). We control for the exchange rate fluctuation by including the US$/INR daily standard deviation of the exchange rate using the previous 90 days' figures (*US$/INR volatility*). Further, we take account of the time-varying macroeconomic factors by incorporating the last quarter's real gross domestic product growth rate (*Real GDP growth rate*).

We also include "push factors", i.e. factors external to host economies, in our model (Griffin et al., 2004; Stulz, 1999). Richards (2005) argues that changes in global and emerging market returns, that directly affect foreign investors' wealth, has significant implications for investment in an emerging market. We use the previous day's return on the MSCI World Index (*World return*) as a proxy for global return, and the previous day's return on the MSCI Emerging Market Index (*EM return*) as a proxy for emerging market return. Similarly, several studies note that US interest rates, as one of the major push factors, influence the flow of portfolio capital into emerging markets (Sarno et al., 2016; Ülkü, 2015). We factor in this effect by using the previous day's return on the one-year US Treasury Bill rate (*US TB rate*). Finally, investors' risk aversion may also explain the push of equity flows from home countries into host countries (Fratzscher, 2012; Sarno et al., 2016). We control global risk aversion by using the daily return on the Global VIX index (*Global VIX return*). Richards (2005) argues that most of the investment in emerging markets occurs through specialized investment managers investing only in emerging markets. This implies that the riskiness related to emerging markets might also be relevant in the FIIs' decision-making process. Therefore, the return on Emerging Market Volatility Index (*EM VIX return*) is also included as a control variable. A brief description of the control variables is presented in Appendix 2-1. A correlation matrix is presented in Appendix 2-2. We do not find any evidence of multicollinearity. We also test the Variance Inflation Factor (VIF) for all the regression results and find that models are not subject to severe multicollinearity problem.

Table 2-2 provides the descriptive statistics of all the control variables. The *Stock return* declines significantly by around 0.070% after the MAT threat. Similarly, the *Market return* experiences a significant fall of 0.099% but *Market volatility* increases by nearly 0.073% after the MAT threat. These figures provide some initial indications that the subsequent withdrawal after the MAT threat may have a detrimental effect on the market return and volatility. The change in *US$ volatility* (-0.020%), *Real GDP growth rate* (-1.688%) and *US TB rate* (0.059%) after the MAT threat are also statistically significant and could potentially influence the trading of FIIs.

Table 2-2: Descriptive statistics of control variables

This table shows the overall summary statistics of control variables used in this study. The definition of the control variables and their sources are discussed in Appendix 2-1. *Pre-MAT threat period* is January 1-March 31, 2015 and *MAT threat period* is April 1-August 31, 2015. *Difference* shows the difference between *MAT threat period* and *Pre-MAT threat period* average values. *t-stat* is the *t*-statistics of the difference figure with a probability of the alternative hypothesis that the average difference is less than zero (i.e. *MAT* average - *Pre-MAT* average <0). The corresponding standard errors *(Std. error)* are also reported. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

	Sample mean	Sample median	Sample SD	Mean		Difference (2) - (1)	*t*-stat	Std. error
				Pre-MAT threat period (1)	MAT threat period (2)			
Stock return (%)	-0.023	-0.060	2.837	0.021	-0.049	-0.070***	-8.891	0.008
Market return (%)	-0.020	0.009	1.083	0.042	-0.057	-0.099**	-2.335	0.042
Market volatility (%)	0.967	0.969	0.082	0.922	0.995	0.073***	3.123	0.023
USD volatility (%)	0.311	0.320	0.021	0.324	0.304	-0.020***	-6.946	0.003
Real GDP growth rate (%)	2.498	3.560	2.979	3.560	1.871	-1.688***	-3.669	0.460
EM return (%)	-0.102	-0.098	0.975	0.019	-0.172	-0.191	-1.220	0.157
World return (%)	-0.017	-0.005	0.796	0.034	-0.047	-0.080	-0.625	0.128
US TB rate (%)	0.262	0.250	0.056	0.225	0.284	0.059***	7.573	0.008
EM VIX return (%)	0.354	-0.547	8.006	-0.101	0.618	0.719	0.557	1.292
Global VIX return (%)	0.208	-0.107	8.864	-0.156	0.420	0.576	0.402	1.431

2.4.3 Identification of treatment and control group

The SEBI does not provide the trading data for domestic portfolio investors. Therefore, we do not have any natural treatment and control groups. To generate a quasi-treatment and a quasi-control group, we divide the firms based on total cumulative holdings (TCH) for each sector. TCH is the cumulative sum of all net equity trades (value of shares bought – value of shares sold) by FIIs from January 1, 2003[32] to March 31, 2015. We then use the following procedure to generate the treatment and control groups. First, using the first two digits of the National Industry Classification of India, we identify the different sectors in which FIIs invest. For each sector, we then calculate the TCH and sort the entire sectors from highest to lowest TCH (TCH generated from January 1, 2003 to March 31, 2015). Next, we identify the three terciles and define the top 33rd percentile of the sectors that have the highest value of exposure (TCH) as the treatment group and the bottom 33rd percentile as the control group.[33] Therefore, we argue that any exogenous shocks that affect the trading activities would have a greater impact on sectors that had the highest TCH (treatment group) as compared to sectors that had the lowest TCH (control group). The weekly trend in TCH of the treatment group compared to the control group before and after the MAT effective date is presented in Figure 2-2.

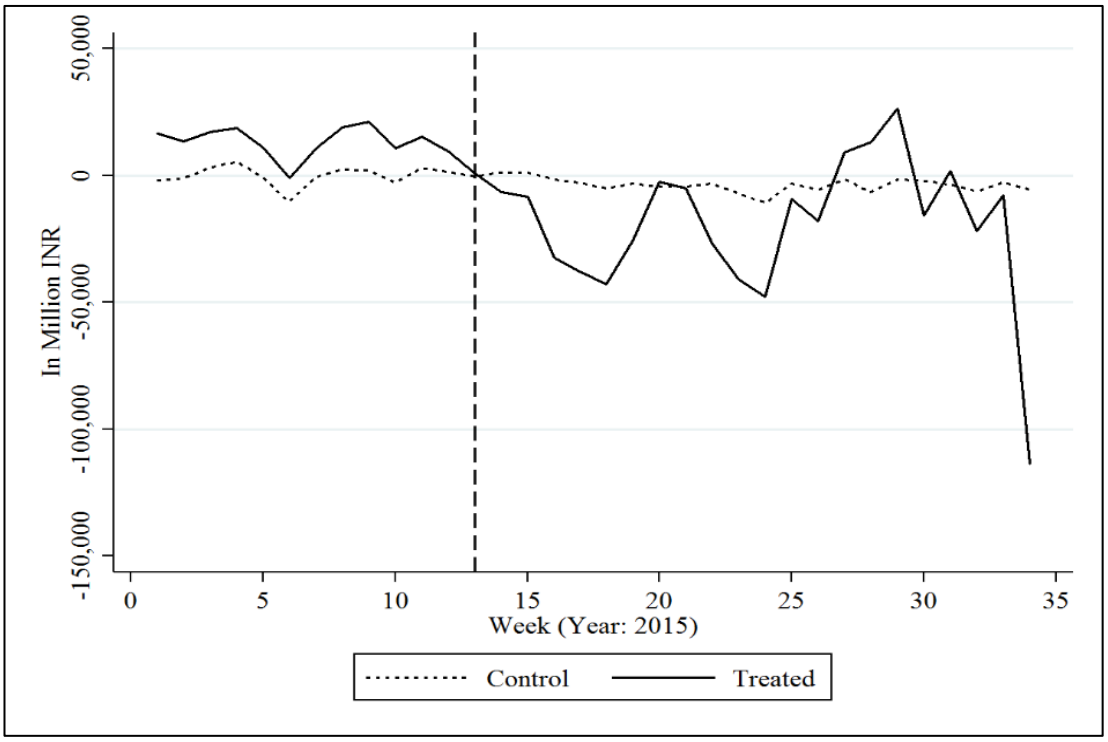
Figure 2-2 shows that firms in the treatment and control groups exhibit more-or-less a common trend in the TCH before the MAT threat, strongly indicating that the parallel trend is not violated prior to the tax threat. However, after the tax threat week (week number 13), we can clearly observe a fall in the trading of treatment firms relative to the control firms up until week number 34 (end of August 2015). In the study, one of our purposes is to provide an average estimate of the fall in the treatment group compared to the control group.

[32] The FIIs' trading data are only available from the year 2003.

[33] We find that the TCH in sectors such as financial services, textiles, IT, pharmaceuticals, and telecom are substantially higher compared to sectors such as advertising and market research, retail trade, mining, construction companies, and sports and recreation.

Figure 2-2: Weekly total cumulative holdings (TCH) for treatment and control group

This figure shows the trend in weekly TCH for the treatment and control groups during the *Pre-MAT* and *MAT threat period* (January 1, 2015 to August 31, 2015). The vertical dashed line represents the week (number 13) of the effective date of the MAT threat (i.e. April 1, 2015). We calculate TCH for each sector by all FIIs from January 1, 2003 to March 31, 2015 and designate firms in the top 33rd percentile sectors as the treatment group and the bottom 33rd percentile sectors as the control group.



2.5 MAT threat and FIIs' trading activities

In this section, we examine the trading activities of FIIs by assessing the univariate summary of differences in NET_{it}, as defined in Equation (3-1), between the *Pre-* and *MAT threat period* for the entire sample, followed by multivariate analysis.

2.5.1 Effect of MAT threat: Mean differences

We begin our study by conducting a paired *t*-test for the mean differences in NET_{it} before and after the MAT threat using five different window periods around the MAT effective period of 1 April 2019. In addition to using longer time series (e.g. five months), we also use smaller pre-post window period (e.g. seven trading days) because of the following reasons. In the field of natural experiments partial causal links could

be established if we are able to isolate other confounding factors. To materialize such effect, the pre and post window periods should be as short as possible before other factors could creep-in to render the link noisy (Bertrand et al. 2004). In our case, we have used a transaction level daily data with a minimum of seven trading days. Examining equity trading for a smaller window period provides cleaner and more credible evidence that FPIs reaction is caused, at least partially, by the threat of impending tax. We use seven trading days' data before the effective date as *Pre-MAT threat period* and seven trading days' after the effective date as *MAT threat period*. We also use *One month, Two months'* and *Three months'* window periods. Finally, our *Sample period* window uses the trading data between January 1 to March 31, 2015 as the *Pre-MAT threat period* and April 1, 2015 to August 31, 2015 as the *MAT threat period*.

Table 2-3: Net equity trading for different window periods

This table shows the paired *t*-test of the differences in average daily net equity trading value as a percentage of previous day market capitalization (reported in pbs units) of listed stocks in BSE/NSE by all FIIs. The column *Window period* denotes the different period of trading days. The column *Pre-MAT threat period* shows the average value for the corresponding trading window before MAT effective date (April 1, 2015) and *MAT threat period* shows the average value of corresponding trading window after the MAT effective date. For *Seven trading days*, we use seven trading days' data before April 1, 2015 for *Pre-MAT threat period* and seven trading days' data after April 1, 2015 for *MAT threat period*. The case for *One month, Two months* and *Three months'* window periods is similar. For the *Sample period*, we use January 1 to March 31, 2015 for the *Pre-MAT threat period* and April 1, 2015 to August 31, 2015 for the *MAT threat period*. The column *Difference* shows the difference between *MAT threat period* and *Pre-MAT threat period* average values. *t-stat* is the *t*-statistics of the difference figure with a probability of the alternative hypothesis that the average difference is less than zero (i.e. *MAT* average - *Pre-MAT* average <0). Standard errors are reported in the column *Std. error*. The column *Observations* shows the sample size included in each window. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

Window period	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error	Observations
Seven trading days	0.401	0.166	-0.235***	-4.776	0.050	14,054
One month	0.375	0.030	-0.346***	-10.216	0.034	28,425
Two months	0.286	0.034	-0.252***	-10.588	0.024	55,882
Three months	0.225	-0.019	-0.243***	-12.048	0.020	85,110
Sample period	0.225	-0.049	-0.274***	-15.404	0.018	116,870

The results in Table 2-3 show the difference in average NET_{it}. In relation to the *Pre-MAT threat period*, after the threat of MAT liability, there was a decline of 0.235 basis points in NET_{it} within *Seven trading days*, statistically significant at the

1% level. On average, the MAT threat leads to the daily withdrawal of almost INR 5.63 million market capitalization per share. The difference is higher for other window periods.[34] During the *Sample period*, the daily average withdrawal constitutes virtually INR 6.45 million market capitalization per equity (approximately US$ 0.10 million). The statistically and economically significant univariate differences in average NET_{it} for various windows provides initial support to our theoretical prediction that FIIs withdrew from the market in response to the threat of MAT. Further, the baseline regression results, with and without control variables, showing the effect of the MAT threat on FIIs' trading, is presented in the Appendix 2-4. The results from these regression estimations are qualitatively similar to Table 2-3, indicating that the MAT threat led to investment outflows by FIIs.

2.5.2 Effect of MAT threat: Difference-in-differences results

In this section, we present the results of our quasi-natural experiment using the Difference-in-Differences (DiD) method with the MAT effective date as the exogenous shock date.[35] We undertake the DiD examination in two ways. First, we examine the mean difference in the NET_{it} values for the treatment and control groups before and after the MAT threat. Panel A of Table 2-4 presents the results of DiD for NET_{it} values for the *Pre-MAT threat period* and *MAT threat period*. Firms in the treatment group are compared to the control group. We find an economically significant effect of the tax threat on NET_{it}. For firms in the treatment group, the figure drops from 0.2322 to -0.0484, a fall of 0.2807 basis points of market capitalization, statistically significant at the 1% level. In contrast, for control firms, there is a marginal fall from 0.1815 to 0.1030, a fall of 0.0785 basis points, which is not statistically significant. There is no statistical difference in the NET_{it} between the treatment and the control group prior to the MAT effective date. However, after the effective date,

[34] The average market capitalization during the *Seven trading days*, *One month*, *Two months*, *Three months* and *Sample period* was around INR 239.68, INR 236, INR 237.87, INR 236.86 and INR 235.41 billion, respectively.

[35] This method compares the effect of an event on groups affected or more affected by the event (called the treatment group) with those that are unaffected or least unaffected (called the control group) (Ashenfelter, 1978; Vig, 2013).

the NET_{it} of treatment firms drops by 0.2022 basis points more than control firms. The differential effect is not only statistically significant but also economically meaningful with a daily reduction of approximately INR 4.76 million market capitalization per share (around US$ 0.08 million).[36]

Table 2-4: Mean and regression-based difference-in-differences

This table presents the mean DiD and regression-based DiD. Panel A shows the difference between the differences of treatment and control groups for the average value of NET_{it} between *Pre-MAT threat period* (January 1-March 31, 2015) and *MAT threat period* (April 1-August 31, 2015). NET_{it} is the day *t* net trading value by all FIIs as a percentage of the previous day's market capitalization of listed stocks *(i)* on the Indian stock market (reported in pbs units). *Treatment* represents the firms in the treatment group and *Control* represents firms in the control group. We calculate total cumulative holdings for each sector by all FIIs from January 1, 2003 to March 31, 2015 and designate firms in the top 33rd percentile sectors as the treatment group and the bottom 33rd percentile sectors as the control group. Panel B reports the regression results of the following regression specification for different window periods:

$$NET_{it} = \beta(MAT\ effect_t \times TRMT_i) + X_{it-1} + \gamma_i + \delta_t + \varepsilon_{it}$$

where: NET_{it} is the day *t* net trading value by all FIIs as a percentage of previous day's market capitalization of listed stocks *(i)* on the Indian stock market (reported in pbs units). $MAT\ effect_t$ is the dummy variable which takes the value of 0 in the *Pre-MAT threat period* and 1 in the *MAT threat period* for seven trading days, one month, two months, three months and the threat period (see notes to Table 2-3). $TRMT_i$ is the dummy variable which takes the value of 1 for the treatment group and 0 for the control group. X_{it-1} is the vector of control variables defined in Appendix 2-1. γ_i is the vector of firm dummies controlling for firm fixed effects. δ_t controls time (day) fixed effects. ε_{it} is the error term. Standard errors are corrected for clustering at the firm level and time (day). *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively. The sample period ranges from January 1, 2015 to August 31, 2015.

Panel A: Firm level Difference-in-Differences analysis

	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error
Treatment	0.2322	-0.0484	-0.2807***	-13.169	0.000
Control	0.1815	0.1030	-0.0785	-1.233	0.218
Difference (Pre-MAT)	0.0507			1.019	0.308
Difference (MAT)		-0.1514***		-3.879	0.000
Difference-in-Differences			-0.2022***	-3.810	0.001

[36] Calculated as 0.2022 basis points of daily average market capitalization during the *Sample period*, which is around INR 235.41 billion.

Panel B: Different periods-based Difference-in-Differences regression

	Seven trading days	One month	Two months	Three months	Sample period	Sample period
$MAT\ effect_t \times TRMT_i$	-0.198**	-0.276***	-0.327***	-0.349***	-0.359***	-0.309***
	(-2.37)	(-2.86)	(-4.50)	(-6.70)	(-5.72)	(-4.55)
Stock return						0.102***
						(11.96)
Market return						-0.000
						(-0.00)
Market volatility						-0.712**
						(-2.46)
US$ volatility						-5.269**
						(-2.16)
Real GDP growth rate						0.005
						(0.43)
World return						-0.304
						(-0.46)
EM return						0.416*
						(1.86)
US TB rate						-2.552***
						(-3.00)
EM VIX return						0.006
						(1.43)
Global VIX return						-0.007
						(-1.39)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time (day) fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.239	0.204	0.165	0.139	0.121	0.128
Number of firms	590	666	737	783	863	855
Number of observations	11,829	23,990	47,128	71,804	98,757	96,614

The second approach we take is to examine the regression coefficient for the following equation. We run the DiD using Equation (2-8) for different window periods without control variables and for the *Sample period* with control variables:

$$NET_{it} = \beta(MAT\ effect_t \times TRMT_i) + X_{it-1} + \gamma_i + \delta_t + \varepsilon_{it} \quad (2\text{-}8)$$

In Equation (2-8), NET_{it} is the day *t* net equity trading, as defined in Equation (2-8). $MAT\ effect_t$ is the dummy variable which takes the value of 1 in the *MAT threat period* and 0 in the *Pre-MAT threat period* for different window periods (as shown in Table 2-4). $TRMT_i$ is the dummy variable that takes the value of 1 for firms in the treatment group and 0 for firms in the control group. X_{it-1} is a set of control variables discussed in Section 2.4.2. γ_i is the vector of firm dummies controlling for firm fixed effects.[37] We include time (days) fixed effects (δ_t) to account for time trends. We cluster our standard errors at firm and time (day) level. ε_{it} is the error term. The term β, which captures the DiD effect, relates to a change in NET_{it} of the treatment firms relative to a corresponding change in the control firms.

The estimates in Panel B of Table 2-4 provide evidence consistent with our conjecture that the MAT threat has a detrimental effect on FIIs' trading activities. Our main variable of interest, $MAT\ effect_t \times TRMT_i$, is statistically significant at 1% in all models, which confirms our arguments on the MAT threat. The statistically significant estimate of -0.309 reported in Model 3 clearly indicates that treatment firms' equities were sold considerably more frequently by FIIs relative to the control group firms. The MAT threat is not only statistically significant at the 1% level but economically meaningful as well, as it results in a daily reduction of INR 7.27 million market capitalization per share (approximately US$ 0.12 million). These findings are consistent with the theoretical framework of Bacchetta and Van Wincoop (2000) discussed in the Section 2.3.2.

For the control variables, we find support for the return-chasing behavior/momentum trading at the firm level, but not at the market level, suggesting that FIIs seem to exploit firm-level recent returns to extract information about future

[37] We also conduct robustness tests using industry fixed effects and find similar results. The results are available upon request.

returns. Further, we find strong evidence of the significance of pull factors. The negative impact of *Market volatility* on NET_{it} is consistent with Ülkü (2015), which implies that there is an increase in market uncertainty during the *MAT threat period*. In line with the findings of Hau and Rey (2006), the outcomes also indicate that higher exchange rate volatility (*US$ volatility*) results in lower net foreign portfolio inflow. Further, among various push factors, we find a significant influence of the *US TB rate* during the sample period, providing some evidence of the significance of global push factors (Ülkü, 2015).

This key result holds, even after conducting a series of robustness checks addressing different concerns that could potentially challenge the credibility of the results of Equation (2-8). We discuss these in the next section.

2.5.3 Robustness tests

2.5.3.1 Timing of the events

As noted above, we use April 1, 2015 as the key event date in our empirical examination. However, one could argue that the FPIs may be aware of the impending tax threat following the first announcement on February 28, 2015. If this announcement created a tax threat, we would observe immediate withdrawal by FPIs. We re-run our empirical examination, similar to Table 2-3 and Table 2-4, assuming February 28, 2015 as the event date. We examine the FPIs' NET_{it} for two window periods: seven working days and one-month. We do not analyse periods larger than one-month as it will include the main event date of April 1, 2015. For brevity, the results are presented in the Appendix 2-5. As expected, we do not find any significant withdrawal by FPIs in the immediate period following February 28, 2015. The mean and regression-based difference-in-differences also do not yield any significant results. These results support our argument that the threat of significant tax liability surfaced only after April 1, 2015, when hefty tax demands were made by the Indian tax authorities.

We also examine two other events related to MAT. On July 23, 2010 the AAR ruled that MAT would not be applicable to FPIs and August 14, 2012 when the

decision was overturned. We expect positive inflows from FPIs following first event and negative inflows from FPIs following second events. We re-run our analysis using July 23, 2010 and August 14, 2012 as the event dates. We analyze FPIs' NET_{it} for one month and three months window periods. For the sake brevity, we report the results in the Appendix 2-6. As expected, we find a marginal increase in FPIs' NET_{it} following the positive announcement on July 23, 2010. We also find that there is a small decline in FPIs' NET_{it} in the period following the announcement on August 14, 2010. As the legality of this announcement was challenged in the Supreme Court, the scale of outflow was significantly smaller relative to the outflow observed in our main results.

2.5.3.2 Alternative treatment and control groups: Based on foreign ownership data

A difficulty in inferring the causal impact of an exogenous shock is to identify a valid comparison group relative to those firms that are highly affected by the MAT threat. So far, in our analysis, the control group consists of firms in a sector where FIIs have lower TCH during January 1, 2003 to March 1, 2015 based on the lowest tercile. One may argue that the FIIs' equity trading for these control firms may be mechanical as these firms may be less-sensitive to the influence of the MAT threat. To eliminate this concern, we identify an alternative treatment and control group based on foreign investors' (FIs') ownership.[38] First, we identify 1,274 firms that FIIs traded during Jan 2015 to August 2015. Next, out of 1,274 firms we identify 985 firms that have FIs' ownership (greater than 0) at the end of 31st March 2015. Then, we sort the FIs' ownership in tercile and define the top 33rd percentile of the firms that have the highest FIs' ownership (higher than 10.39%) as the treatment group and the bottom 33rd percentile (lower than 1.92%) as the control group. Alternatively, we also use the median (5.64%) as a cut-off point. The results using this alternative identification are presented in Models 1 and 2 of Table 2-5. These results are consistent with our main results in Table 2-4.

[38] We obtain the ownership variable, reflecting share of ownership (in %) in the Indian firms, from the Prowess database, which is extensively used by existing literature (see Vig, 2013).

Table 2-5: Robustness tests: Alternative treatment and control group

This table reports the regression results for different specifications of the following regression specification for Models 1 and 2:

$$NET_{it} = \beta(MAT\ effect_t \times Alt\_TRMT) + X_{it-1} + \gamma_i + \delta_t + \vartheta_j + \delta_t \times \alpha_k + \varepsilon_{it}$$

where: NET_{it} is the day *t* net trading value by all FIIs as a percentage of the previous day's market capitalization of listed stocks *(i)* on the Indian stock market (reported in pbs units). NET_{jit} is the day *t* net trading value by each FII *j* as a percentage of the previous day's market capitalization of listed stocks *(i)* (reported in pbs units). $MAT\ effect_t$ is the dummy variable, which takes the value of 0 in the *Pre-MAT threat period* (January 1-March 31, 2015) and 1 in the *MAT threat period* (April 1-August 31, 2015). Alt_TRMT_i is the dummy variable which takes the value of 1 for the alternative treatment group and 0 for the alternative control group. In Models 1 and 2, the alternative treatment and control groups are based on the foreign investors' (FIs') ownership on 31st March 2015 and in Models 3 and 4, the alternative treatment and control groups are based on the FIIs' identification. X_{it-1} is the set of control variables as defined in Appendix 2-1. γ_i is the vector of firm dummies controlling for firm fixed effects. δ_t and ϑ_j control time (day) and FIIs' fixed effects, respectively, where indicated. ε_{it} is the error term. Standard errors are corrected for clustering at the firm level, time (day) level and FIIs' level where indicated. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively. The sample period ranges from January 1, 2015 to August 31, 2015.

	FIs' Ownership		FIIs' identification	
	Top/bottom tercile (1)	Median (2)	Top/bottom tercile (3)	Median (4)
$MAT\ effect_t \times Alt\_TRMT$	-0.383***	-0.384***	-0.202***	-0.128***
	(-4.58)	(-5.32)	(-5.10)	(-4.95)
Stock return	0.076***	0.068***	0.013***	0.014***
	(8.97)	(11.24)	(9.07)	(9.81)
Market return	0.029	0.019	-0.006	-0.006
	(0.91)	(0.72)	(-0.70)	(-0.72)
Market volatility	-0.96**	-0.90*	-0.319***	-0.289***
	(-2.68)	(-2.04)	(-4.90)	(-4.67)
US$ volatility	-6.095**	-5.23**	-0.196	-0.246
	(-2.48)	(-2.63)	(-0.41)	(-0.54)
Real GDP growth rate	0.009	0.005	0.005**	0.005**
	(0.61)	(0.47)	(2.62)	(2.46)
EM return	0.030	0.047	-0.148	-0.126
	(0.86)	(1.52)	(-1.57)	(-1.40)
World return	-0.019	-0.029	-0.006	-0.006
	(-0.22)	(-0.39)	(-0.02)	(-0.03)
US TB rate	-1.528*	-1.728**	-0.971***	-0.911***
	(-1.71)	(-2.16)	(-5.60)	(-5.82)
EM VIX return	0.007	0.007	-0.001	-0.001
	(1.25)	(1.65)	(-0.64)	(-0.65)
Global VIX return	-0.009	-0.008	-0.001	-0.001
	(-1.58)	(-1.53)	(-0.53)	(-0.49)
Firm fixed effects	Yes	Yes	No	No
Time (day) fixed effects	Yes	Yes	Yes	Yes
FII fixed effects	No	No	Yes	Yes
Adjusted R^2	0.115	0.105	0.102	0.101
Number of firms	605	995	1,005	1,038
Number of observations	74,489	110,113	604,518	651,308

2.5.3.3 Alternative treatment and control groups: Based on FIIs' unique identification code

We also create alternative treatment and control groups based on the FIIs' unique identification code. Though the public data set provided by NSDL masks the names of the FIIs, it does provide a unique key (code) for each of them. As such, we make use of this unique code to generate the alternative treatment and control groups. To do so we first calculate a modified net equity trading measure for each FII denoted as *j*, as shown in Equation (2-9):

$$NET_{jit} = \frac{\sum(Quantity_{j,i,t} \times Price_{j,i,t})}{MCap_{i,t-1}} \quad (2\text{-}9)$$

In Equation (2-9), $\sum(Quantity_{j,i,t} \times Price_{j,i,t})$ is the net equity trading on trading day *t* for equity *i* by FII *j*. All other indicators are as previously defined. In this case, the NET_{jit} is the sum of all equity trades (purchase as positive trade and sell as negative trade) by each FII for each stock, each day, scaled by previous day market capitalization. Next, we identify the control and the treatment groups based on the TCH values for each FII (instead of sector in the original identification) from January 1, 2003 to March 31, 2015 (sorted based on highest value to the lowest). Initially, we create a treatment and a control group based on terciles of the TCH values (FIIs with the top 33rd percentile as the treatment group and the bottom 33rd percentile as the control group) and then create other alternative groups based on the cut-off point of the median TCH values (FIIs higher than median TCH values as the treatment group and below the median as the control group). We rerun Equation (2-8) by replacing NET_{it} by NET_{jit} and including FIIs' fixed effects in our regression in addition to firm and time (day) fixed effects. The results are presented in Table 2-5 (Models 3 and 4). In Model 3, we use terciles as the cut-off point and in Model 4, we use median value as the cut-off point, as discussed above. In all alternative models using FIIs' identifications, the results are consistent with our main results.

2.5.3.4 Non-parametric permutation test

Bertrand et al. (2004) raise concerns about potential serial correlation in DiD estimates, which could bias the standard errors, leading to over-rejection of the null hypothesis of no effect. Our study could suffer from the presence of severe serial correlation due to the persistence nature of the data. To address this concern, we perform a non-parametric permutation test for β=0. If DiD provides an appropriate estimate, we would expect to reject the null hypothesis of no effect, i.e. β=0 (Bertrand et al., 2004). We compute the DiD estimates for a large number of randomly generated placebo MAT events and use a permutation of the treatment and control groups to examine the empirical distribution of the estimated effects for these placebos.[39] The test is similar in spirit to Chetty et al. (2009).[40] First, we perform 100 independent draws of $MAT\ effect_t$ between April 1, 2004 and August 31, 2014. For each of these draws, we permute the treatment and control groups by industry and then randomly select 31 sets of the treatment and control groups.[41] We then re-estimate Equation (2-8) with random $MAT\ effect_t$ and random the treatment and control groups obtaining 100×31=3,100 placebo estimates to construct the empirical cumulative distribution function $G(\hat{\beta}_p)$. The statistic $G(\beta)$ gives a p-value for the hypothesis that β=0. We expect the estimated coefficient of β from Equation (2-8) to be in the lower tail of the empirical cumulative distribution function of placebo effects.

Figure 2-3 shows the results of the permutation test by plotting the empirical cumulative distribution of placebo effects G for NET_{it} (Equation (2-8)).The dashed vertical line in the figure denotes the DiD coefficient as reported in Panel C of

[39] We also conduct a placebo test-particularly a "false experiment". The basic idea is that if the underlying effect is detectable in the period other than the MAT threat period, then it would be difficult to attribute the effect to the tax threat that occurred only during the event period. To eliminate this concern, we run a similar specification in Equation (3-2), modified to assume the occurrence of non-existent event (placebo event) in the period other than the year 2015, i.e. for 2014. The estimated "effect" for an event in 2014 is statistically indistinguishable from zero. The absence of any significant estimated effects for these false experiments provides us with confidence that our main results are attributable to the MAT threat rather than to some other confounding factors. The result is available upon request.

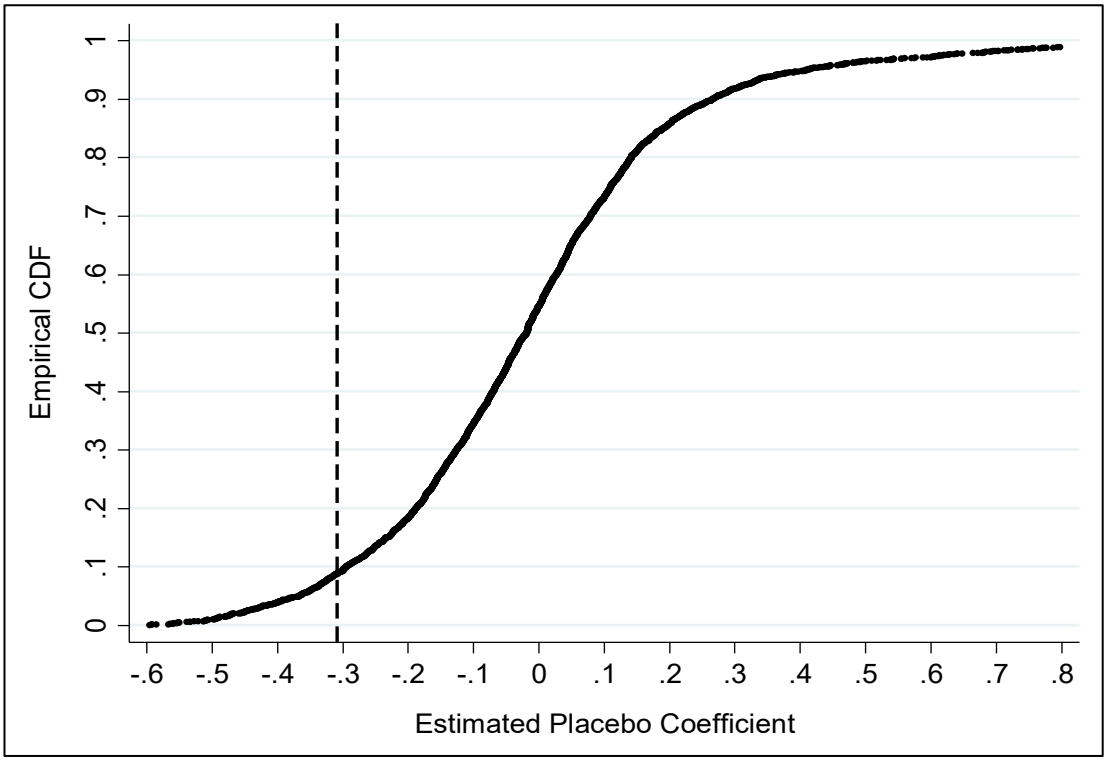
[40] This test is closely related to Fisher's (1922) "exact test" or the randomization inference test, discussed in Rosenbaum (1996).

[41] The identification of the treatment and control groups discussed in Section 2.4.3 results in 31 sets of treatment and control industries.

Table 2-4. For DiD coefficient β= -0.309, the $G(\beta)$=0.087. Although the p-value is larger than the p-value of the DiD coefficient, it confirms that the MAT threat led to a substantial decline in the NET_{it} by FIIs.

Figure 2-3: Empirical Distribution of Placebo Events

This figure plots the empirical distribution of placebo effects *(G)* for Net Equity Trading (NET_{it}). The cumulative distribution function (CDF) is constructed from 3,100 estimates of δ_p using the specification in Equation (3-2). No parametric smoothing is applied: the CDF appears smooth because of the large number of points used to construct it. The vertical line shows the DiD estimate reported in Model 6 of Table 2-4.



2.5.3.5 Other systematic shocks and balanced panels

One of the challenges in isolating the effect of the MAT threat is the existence of other confounding events that may have occurred during the same period. Any of these events, if not controlled, could result in a biased estimation of the treatment effect. We conduct an extensive search of national and international newspapers to identify any major exogenous shocks that could substantially affect the trading behavior of FIIs that may not have been captured by our control variables, time (day) effect, and firm-specific effect. One possible effect on the trading of FIIs was the possibility of Greece

exiting from the Eurozone, referred to as "*Grexit*" hereafter.[42] It is possible that the threat of *Grexit* would have amplified the global risk aversion and uncertainty, triggering withdrawal of funds by FIIs from emerging markets. To test this possibility, we include an additional dummy variable, $Grexit_t$, that takes a value of 1 for the period between June 22, 2015 and July 13, 2015. The results are presented in Table 2-6. In Model 1, we include our $Grexit_t$ dummy variable in Equation (2-8) along with all the formerly used control variables, including time (day) and firm fixed effects. The $Grexit_t$ dummy variable is statistically insignificant, and our main result is still robust. The economic significance of our main variable is similar to the results reported in Table 2-4. Further, to control for any other industry-specific shocks that may have altered the trading behaviours, we include the interaction between sector and time (day) fixed effects ($\delta_t \times \alpha_k$) in Model 2. Similarly to Model 1, the $Grexit_t$ dummy is statistically insignificant and the main variable of interest, $MAT\ effect_t \times TRMT$, remains statistically significant and economically similar to our earlier results in Table 2-4.

Given that our daily panel data is unbalanced, there is the possibility of attrition bias. To ensure that our estimates using unbalanced panel data are robust to attrition bias, we rerun Equation (2-8) using fully balanced data during the sample period.[43] The results are reported in Table 2-6 (Model 3). In this balanced setting, our primary results on the MAT threat are consistent with our main results.

[42] On June 22, 2015, the Greek government submitted an "economic reform" proposal in a bid to negotiate a 7.2 billion euros rescue package to meet its debt obligations and reduce the possibility of *Grexit*. The Euro-group meeting was held on June 24, 2015 to discuss the proposal and negotiate bailout agreements. Bank of America Merrill Lynch stressed in their research report that FIIs were closely monitoring the bailout negotiations and in the event of *Grexit,* FIIs' investment in the equity market of India could stall, potentially driven by increased global risk aversion. On July 13, 2015, after days of negotiations, Eurozone leaders and the Greek government agreed on a bailout package conditional on various economic and policy reforms. "Grexit may stall FII inflows into India: Bank of America Merrill Lynch", *The Economic Times*, July 4, 2015.

[43] We only include those firms that were traded during the sample period.

Table 2-6: Robustness tests: Other systematic shocks and balanced panel

This table reports the regression results for different specifications of the following regression specification:

$$NET_{it} = \beta_1(MAT\ effect_t \times TRMT_i) + Grexit_t + X_{it-1} + \gamma_i + \delta_t + \delta_t \times \alpha_k + \varepsilon_{it}$$

where: NET_{it} is the day *t* net trading value by all FIIs as a percentage of the previous day's market capitalization of listed stocks *(i)* on the Indian stock market (reported in pbs units). NET_{jit} is the day *t* net trading value by each FII *j* as a percentage of the previous day's market capitalization of listed stocks *(i)* (reported in pbs units). $MAT\ effect_t$ is the dummy variable, which takes the value of 0 in the *Pre-MAT threat period* (January 1-March 31, 2015) and 1 in the *MAT threat period* (April 1-August 31, 2015). $TRMT_i$ is the dummy variable which takes the value of 1 for the treatment group and 0 for the control group. $Grexit_t$ is the dummy variable which takes the value of 1 for the period between June 22, 2015 and July 13, 2015. X_{it-1} is the set of control variables as defined in Appendix 2-1. γ_i is the vector of firm dummies controlling for firm fixed effects. δ_t controls time (day) fixed effects, where indicated. $\delta_t \times \alpha_k$ is an interaction of time and sector fixed effects (α_k) for controlling any other unexpected shocks (Model 2). ε_{it} is the error term. Standard errors are corrected for clustering at the firm level, time (day) level and FIIs' level where indicated. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively. The sample period ranges from January 1, 2015 to August 31, 2015.

	Addressing systematic shocks		Balanced panel
	(1)	(2)	(3)
$MAT\ effect_t \times TRMT$	-0.283***	-0.292***	-0.495**
	(-3.91)	(-4.84)	(-2.38)
$Grexit_t$	-0.082	-0.080	
	(-0.87)	(-1.18)	
Stock return	0.103***	0.104***	0.225***
	(11.54)	(13.96)	(7.31)
Market return	-0.033	-0.033*	0.119
	(-1.10)	(-1.68)	(1.29)
Market volatility	-0.455	-0.457*	-1.132
	(-1.35)	(-1.88)	(-1.31)
US$ volatility	-7.298***	-7.306***	-19.24***
	(-2.78)	(-4.40)	(-2.96)
Real GDP growth rate	0.006	0.006	-0.036
	(0.46)	(0.60)	(-1.02)
EM return	0.333	0.337	0.615
	(1.27)	(1.41)	(0.84)
World return	-0.051	-0.072	-0.670
	(-0.07)	(-0.19)	(-0.38)
US TB rate	-2.897***	-2.843***	-9.601***
	(-3.69)	(-4.84)	(-4.21)
EM VIX return	0.000	0.000	0.016
	(0.08)	(0.18)	(1.39)
Global VIX return	-0.003	-0.003	-0.030*
	(-0.46)	(-0.93)	(-1.80)
Firm fixed effects	Yes	Yes	Yes
Time (day) fixed effects	Yes	No	Yes
Time × Sector fixed effects	No	Yes	No
Adjusted R^2	0.135	0.146	0.087
Number of firms	855	852	91
Number of observations	96,614	96,575	14,833

2.6 Stock market implications of MAT announcements and market withdrawal

Our empirical analysis to this point is consistent with the conjecture that the announcement of MAT led to substantial outflows by FIIs. So, what are the implications of such announcement and subsequent withdrawals on the Indian stock market? In this section, we investigate the impact of the MAT announcement and the

subsequent withdrawal of funds on stock volatility, stock liquidity (which is also a proxy for the cost of capital) and on stock returns.

2.6.1 Withdrawal and stock volatility

In this section, we examine the effect of FIIs' market withdrawal on stock return volatility. Emerging equity markets are characterized as generally having high volatility which, in turn, can also increase the cost of capital of the firms. Similarly, studies that examine the issues of liberalization and volatility show that the emerging market stock volatility reduces after liberalizing when foreign investors begin holding the local market (Bekaert and Harvey, 1997, 2000; Kim and Singal, 2000). Following this argument, we suggest that when FIIs withdraw from the market, the stock *Realized volatility* (RV) should increase. We calculate firm-level RV by using the square of daily stock returns.

However, it is also well established in the literature that *Option-implied volatility* (IV) is often higher than the subsequent RV, as options are priced over its true level of risk (see Bakshi and Madan, 2006; Bollerslev et al., 2011). The volatility risk premium (VRP) – defined as the difference between the implied volatility and realized volatility – represents a premium that investors are willing to pay to hold options in their portfolio (Bakshi and Kapadia, 2003). These hedging motives suggest that the IV would be higher than RV during a period of adverse market conditions, as buyers are willing to pay a premium for downside protection (Bakshi and Kapadia, 2003). Following this argument, we suggest that when FIIs withdraw from the market, both the IV and VRP should also increase. To compute the IVs, we use the Black and Scholes (1973) formulae discussed in Appendix 2-3.

In terms of empirical analysis, we first present a visual inspection of IV and RV as shown in Figure 2-4, followed by an examination of the changes in IV, RV and VRP following the MAT threat.

Figure 2-4: Option-Implied and Realized Volatilities

This figure plots the Option-Implied Volatility and Realized Volatility for the *Pre-MAT threat period* and *MAT threat period*. The dashed vertical line denotes the effective date of the MAT announcement, i.e. April 1, 2015.

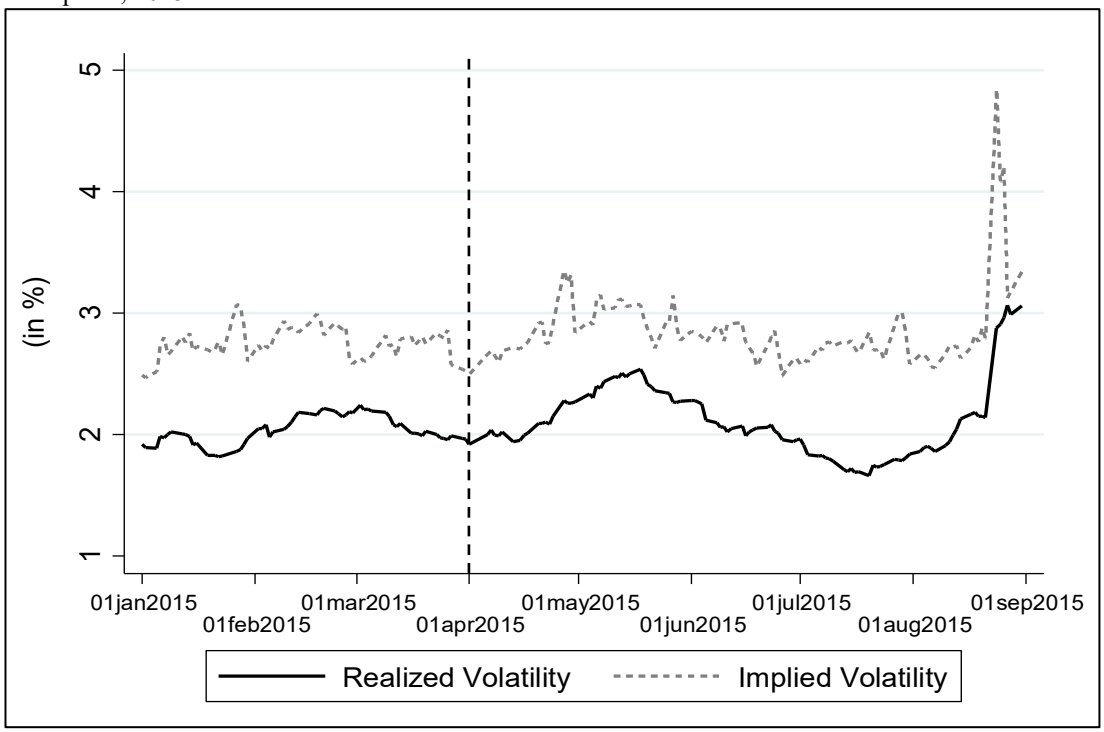


Figure 2-4 plots the IV and RV and in line with our expectations, the RV over our sample period is lower than the IV. However, the gap between the RV and the IV widens after the MAT event date. Panel A Table 2-7 shows the changes in IV, RV and VRP, respectively, after the MAT effective date for different window periods. The results show a statistically significant increase in IV (mean difference = 0.10%), RV (mean difference = 0.05%) and the VRP (mean difference=0.05%) after the MAT threat.

Next, we also conduct a mean DiD analysis for VRP. Panel B of Table 2-7 shows the results of the mean difference in VRP for the firms in the treatment group compared to the firms in the control group values for the *Pre-MAT threat period* and *MAT threat period*.

Table 2-7: Implications of FIIs' withdrawal on stock volatility

This table presents the implications of FIIs' withdrawal after the MAT effect on stock volatility. Panel A presents the mean differences in Option-implied volatility (*IV*), Realized volatility (*RV*), and Volatility risk premium (*VRP*) for the Pre-MAT threat period and MAT threat period (for different window periods). IV is the option-implied volatility measure (in %) calculated using Black and Scholes (1973) options pricing model discussed in Appendix 2-3. *RV* is the daily stock volatility (in %) of firms calculated as the square of stock returns, and *VRP* is the difference in *IV* and *RV*. Panel B presents the difference between the differences in the treatment and control groups for the average value of *VRP* between the *Pre-MAT threat period* (January 1-March 31, 2015) and the *MAT threat period* (April 1-August 31, 2015). *Treatment* represents the firms in the treatment group and *Control* represents firms in the control group. We calculate total cumulative holdings for each sector by all FIIs from January 1, 2003 to March 31, 2015 and designate firms in the top 33rd percentile sectors as the treatment group and the bottom 33rd percentile sectors as the control group. Panel C reports the regression results of the following regression specification:

$$Volatility_{it} = \beta_1(MAT\ effect_t \times TRMT_i \times NET_{it}) + \beta_2(MAT\ effect_t \times TRMT_i) + \beta_3(TRMT_i \times NET_{it}) + \beta_4(MAT\ effect_t \times NET_{it}) + \beta_5(NET_{it}) + X_{it-1} + \gamma_i + \delta_t + \varepsilon_{it}$$

where: $Volatility_{it}$ is three different measures of the volatility: *IV*, *RV* and *VRP*. Firms traded are indexed as *i* and daily time periods are indexed as *t.* $MAT\ effect_t$ is the dummy variable which takes the value of 0 in the *Pre-MAT threat period* (January 1-March 31, 2015) and 1 in the *MAT threat period* (April 1-August 31, 2015). NET_{it} is the net equity trading scaled by previous day market capitalization (in pbs units). $TRMT_i$ is the dummy variable which takes the value of 1 for the treatment group and 0 for the control group. X_{it-1} is the set of control variables as defined in Appendix 2-1. γ_i is the vector of firm dummies controlling for firm fixed effects. δ_t controls time (day) fixed effects. ε_{it} is the error term. Standard errors are corrected for clustering at the firm level and time (day) level. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively. The sample period ranges from January 1, 2015 to August 31, 2015.

Panel A: Mean differences in stock volatility

A.1. Implied volatility (IV) (in %)

Window period	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	2.653	2.735	0.082***	23.748	0.003
One month	2.716	2.824	0.109***	25.087	0.004
Two months	2.770	2.912	0.142***	11.652	0.012
Three months	2.756	2.899	0.143***	11.728	0.012
Sample period	2.756	2.856	0.100***	18.468	0.005

A.2. Realized volatility (RV) (in %)

Window period	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	1.983	2.010	0.027***	6.192	0.004
One month	2.063	2.080	0.017***	4.811	0.003
Two months	2.094	2.126	0.032***	5.533	0.006
Three months	2.034	2.059	0.025***	6.700	0.004
Sample period	2.050	2.101	0.051***	2.237	0.023

A.3. Volatility risk premium (VRP) (in %)

Window period	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	0.669	0.725	0.055***	17.000	0.003
One month	0.652	0.744	0.092***	13.054	0.007
Two months	0.675	0.785	0.110***	10.145	0.011
Three months	0.722	0.840	0.118***	13.491	0.009
Sample period	0.706	0.756	0.050***	9.830	0.005

Panel B: Mean Difference-in-Differences in volatility risk premium (in %)

	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error
Treatment	0.7103	0.7822	0.0719***	10.211	0.007
Control	0.7172	0.7212	0.0040	1.471	0.003
Difference (Pre-MAT)	-0.0069			-0.675	0.010
Difference (MAT)		0. 0610***		3.396	0.018
Difference-in-Differences			0.0679***	2.701	0.025

Panel C: Regression Analysis for Implications on Stock Volatility

	Overall realized volatility (1)	Option-based volatility measures		
		Implied volatility (2)	Realized volatility (3)	Volatility risk premium (4)
$MAT\ effect_t \times TRMT_i \times NET_{it}$	-0.034*	-0.092***	-0.051***	-0.041**
	(-1.90)	(-4.86)	(-3.89)	(-2.51)
Volatility	9.654**	5.08***	4.73***	5.75***
	(2.73)	(6.52)	(8.07)	(5.08)
Turnover ratio	12.954***	1.239	2.29***	2.18***
	(4.13)	(1.56)	(3.16)	(3.07)
Market capitalization	-0.078	-0.148**	-0.069	-0.067**
	(-0.17)	(-2.19)	(-1.03)	(-2.57)
Price-to-Book ratio	0.025	-0.003	0.004	-0.007
	(0.27)	(-0.77)	(0.67)	(-1.61)
Illiquidity index	116.517*	88.5***	69.6***	18.6
	(1.82)	(3.41)	(3.27)	(1.27)
Firm fixed effects	Yes	Yes	Yes	Yes
Time (day) fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.175	0.158	0.143	0.153
Number of firms	753	106	106	106
Number of observations	81,580	15,280	15,280	15,280

We find an economically significant effect of the proposed MAT change on the VRP. For firms in the treatment group, the VRP increases from 71.03 basis points to 78.22 basis points. In contrast, for control firms the figure increases marginally from 71.72 basis points to 72.12 basis points, which is not statistically significant. There is no statistical difference in the VRP between the treatment and the control group prior to the MAT effective date. The mean DiD estimate of the VRP is 6.79 basis points, which is statistically significant at the 1% level of significance. Overall, these results suggest that investors demand a higher risk premium with an expectation of the rise in RV due to the FIIs' withdrawal from the market following the MAT threat.

Our results are also robust to running different multivariate regressions whereby we include several control variables that potentially affect the volatility. For example, we examine the effect of FIIs' withdrawal on stock RV, IV and VRP by running different specifications following the multivariate regression equation:

$$\begin{aligned} Volatility_{it} = {} & \beta_1(MAT\ effect_t \times TRMT_i \times NET_{it}) \\ & + \beta_2(MAT\ effect_t \times TRMT_i) + \beta_3(TRMT_i \times NET_{it}) \\ & + \beta_4(MAT\ effect_t \times NET_{it}) + \beta_5(NET_{it}) \\ & + X_{it-1} + \gamma_i + \delta_t + \varepsilon_{it} \end{aligned} \tag{2-10}$$

where $Volatility_{it}$ is firms' realized volatility (RV), implied volatility (IV) and volatility risk premium (VRP). $MAT\ effect_t$, $TRMT_i$ and NET_{it} are defined in the previous section. We include a set of controls (X_{it-1}) as follows. Empirical evidence suggests that size and liquidity are related to stock return volatility (Bae et al., 2004; Bekaert and Harvey, 1997; Li et al., 2011). Accordingly, we include the log of market capitalization (*Market capitalization*) as a measure of size, and *Turnover ratio* and *Illiquidity index,* as defined earlier, as a measure of stock liquidity. Following Wei and Zhang (2006) and Li et al. (2011), we also include previous day's *Volatility* as it is established that return volatility is auto-correlated. Finally, we also include *Price-to-Book ratio* as a proxy for risk factor.[44]

[44] Chan and Chen (1991) and Fama and French (1993) suggest size and price-to-book ratio are proxies for firm riskiness that capture the variation in stock returns.

The results of the implications for RV, IV and VRP are presented in Panel C of Table 2-7. In Model 1, the main dependent variable is the RV of all stocks traded by FIIs and in Model 2 the main dependent variable is the IV of the stocks traded by FIIs for which options data are available. In Model 3, the main dependent variable is RV and in Model 4, it is VRP. The coefficient of our main variable of the interest β_1 is negative and significant at the 10% level in Model 1. Economically, our results suggest that a one basis point decline in NET_{it} leads to a 0.034% increase in overall RV. Thus, there is weak evidence that FIIs' departure following the MAT effective date potentially has negative consequences for stock RV. However, our results are stronger for option-based volatility measures at the 5% level or greater. We find that a basis point decline in NET_{it} following the MAT threat, significantly increases the IV by 0.092%, RV by 0.051% and VRP by 0.041%. Overall, these results provide an indication that the announcement of the MAT threat (and the subsequent impact of FIIs' withdrawal) increased stock volatility.

2.6.2 Withdrawal and stock liquidity (cost of capital)

In this section, we examine how changes in FIIs' trading trigger changes in stock liquidity, which is also used as a proxy for cost of capital. It is recognized in the literature that lower stock liquidity increases a firm's cost of capital (Amihud and Mendelson, 2000; Balakrishnan et al., 2014). Following this literature, we use three different measures of stock liquidity: *Turnover ratio*, Amihud (2002) *Illiquidity index*, and Hui and Heubel (1984) *Liquidity ratio*. We discuss the construction of these measures in Appendix 2-3. We begin the analysis by presenting the mean difference of the liquidity proxies for different window periods, *Pre-MAT threat period* and *MAT threat period,* as reported in Panel A of Table 2-8. In Panel B, we discuss the mean DiD in stock liquidity for the treatment and control groups for the *Pre-MAT threat period* and the *MAT threat period.*

Table 2-8: Effects of FIIs' withdrawal on stock liquidity

This table presents the effects of FIIs' withdrawal, following the MAT event, on stock liquidity. Panel A presents the mean differences in three proxies of stock liquidity for the *Pre-MAT threat Period* and *MAT threat period* for different window periods. Liquidity measures are proxied using: (i) *Turnover ratio* as the ratio of the number of shares traded in a day and number of shares outstanding (in Panel A.1.); (ii) daily *Illiquidity index* developed by Amihud (2002) (in Panel A.2.), and (iii) daily *Liquidity ratio* developed by Hui and Heubel (1984) (in Panel A.3.). These measures are discussed in detail in Appendix 2-3. Panel B presents the difference between the differences of the treatment and control groups for the average value of three proxies of liquidity measures between the *Pre-MAT threat period* (January 1-March 31, 2015) and the *MAT threat period* (April 1-August 31, 2015). *Treatment* represents the firms in the treatment group and *Control* represents firms in the control group. We calculate total cumulative holdings for each sector by all FIIs from January 1, 2003 to March 31, 2015 and designate firms in the top 33rd percentile sectors as the treatment group and the bottom 33rd percentile sectors as the control group. Panel C reports the regression results of the following regression specification:

$$Y_{it} = \beta_1(MAT\ effect_t \times TRMT_i \times NET_{it}) + \beta_2(MAT\ effect_t \times TRMT_i) + \beta_3(TRMT_i \times NET_{it}) + \beta_4(MAT\ effect_t \times NET_{it}) + \beta_5(NET_{it}) + X_{it-1} + \gamma_i + \delta_t + \varepsilon_{it}$$

where: Y_{it} is a vector of different proxies of liquidity measures as discussed in the notes to Panel A. Firms traded are indexed as *i* and daily time periods are indexed as *t.* $MAT\ effect_t$ is the dummy variable which takes the value of 0 in the *Pre-MAT threat period* (January 1-March 31, 2015) and 1 in the *MAT threat period* (April 1-August 31, 2015). NET_{it} is the net equity trading scaled by previous day market capitalization (in pbs unit). $TRMT_i$ is the dummy variable which takes the value of 1 for the treatment group and 0 for the control group. X_{it-1} is the set of control variables defined in Appendix 2-1. γ_i is the vector of firm dummies controlling for firm fixed effects. δ_t controls time (day) fixed effects. ε_{it} is the error term. Standard errors are corrected for clustering at the firm level and time (day) level. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively. The sample period ranges from January 1, 2015 to August 31, 2015.

Panel A: Mean differences in stock liquidity

A.1. Turnover ratio (in %)

Window period	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	0.197	0.173	-0.024***	-4.843	0.005
One month	0.193	0.189	-0.004	-1.262	0.003
Two months	0.196	0.175	-0.021***	-8.739	0.002
Three months	0.200	0.173	-0.027***	-13.953	0.002
Sample period	0.200	0.189	-0.011***	-6.383	0.002

A.2. Illiquidity index

Window period	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	0.517	0.529	0.022***	3.148	0.007
One month	0.519	0.558	0.039***	3.714	0.011
Two months	0.513	0.591	0.078***	10.137	0.008
Three months	0.490	0.593	0.097***	15.695	0.006
Sample period	0.490	0.574	0.084***	16.385	0.005

A.3. Liquidity ratio

Window period	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	18.174	18.793	0.619***	2.813	0.220
One month	18.167	19.004	0.838***	3.096	0.271
Two months	17.769	20.229	2.460***	12.598	0.195
Three months	17.509	20.494	2.985***	18.837	0.158
Sample period	17.509	19.401	1.892***	13.513	0.140

Panel B: Mean Difference-in-Differences in stock liquidity

B.1. Turnover ratio (in %)

	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error
Treatment	0.2164	0.1828	-0.0336***	-3.015	0.011
Control	0.2109	0.2047	-0.0062	-1.287	0.005
Difference (Pre-MAT)	0.0054			1.174	0.005
Difference (MAT)		-0.0219***		-5.716	0.003
Difference-in-Differences			-0.0274***	-3.420	0.008

B.2. Illiquidity index

	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error
Treatment	0.3837	0.5030	0.1193***	4.724	0.025
Control	0.3740	0.4297	0.0557	1.366	0.041
Difference (Pre-MAT)	0.0097			0.810	0.012
Difference (MAT)		0.0733***		4.300	0.017
Difference-in-Differences			0.0636***	3.970	0.016

B.3. Liquidity ratio

	Pre-MAT threat period (1)	MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error
Treatment	17.2247	22.3942	5.1695***	7.744	0.668
Control	17.7682	19.0784	1.3102	1.365	0.960
Difference (Pre-MAT)	-0.5435			-0.917	0.593
Difference (MAT)		3.3157***		3.215	1.032
Difference-in-Differences			3.8592***	6.810	0.567

Panel C: Regression analysis for implications on stock liquidity

	Turnover ratio	Illiquidity index	Liquidity ratio
	(1)	(2)	(3)
$MAT\ effect_t \times TRMT_i \times NET_{it}$	0.018**	-0.022**	1.842**
	(2.55)	(-2.22)	(2.62)
Volatility	-0.056***	0.642***	1.711***
	(-5.18)	(7.36)	(4.43)
Price	-0.016*	0.269***	0.941***
	(-1.74)	(12.81)	(2.97)
Trades	0.001	-0.103***	-1.234***
	(0.97)	(-18.88)	(-5.87)
Market capitalization	0.069***	-0.001	-3.969***
	(7.23)	(-0.39)	(7.45)
Absolute return	-0.008***	0.166***	0.664***
	(-7.42)	(18.64)	(6.52)
Firm fixed effects	Yes	Yes	Yes
Time (day) fixed effects	Yes	Yes	Yes
Adjusted R^2	0.447	0.367	0.339
Number of firms	778	778	778
Number of observations	82,684	82,684	82,754

Panel A.1. shows a significant decline in *Turnover ratio* following the tax threat for different window periods. In Panel A.2., the results show a significant increase in the *Illiquidity index* and Panel A.3. shows a significant increase in the *Liquidity ratio* (where a higher *Liquidity ratio* suggests lower liquidity). In Panel B (B.1., B.2. and B.3.), we compare the three proxies of liquidity of the firms in the treatment group with the firms in the control group and find significant DiD estimates at the 1% level for all the liquidity proxies. Overall, our results provide evidence of the material impact on stock liquidity following the MAT threat announcement which led to FIIs' withdrawal from the market.[45]

Finally, we investigate the effects on liquidity by running different specifications of the following regression equation:

[45] This result supports Ng et al. (2016) who find that increased FIIs' ownership in a firm increases the stock liquidity of the firm.

$$
\begin{aligned}
Liquidity_{it} = {} & \beta_1(MAT\ effect_t \times TRMT_i \times NET_{it}) \\
& + \beta_2(MAT\ effect_t \times TRMT_i) + \beta_3(TRMT_i \times NET_{it}) \\
& + \beta_4(MAT\ effect_t \times NET_{it}) + \beta_5(NET_{it}) \\
& + X_{it-1} + \gamma_i + \delta_t + \varepsilon_{it}
\end{aligned} \tag{2-11}
$$

In Equation (2-11), $Liquidity_{it}$ is a vector of dependent variables, i.e. measures of stock market liquidity, where firms are indexed as *i* and daily time periods are indexed as *t*. We use our three different liquidity measures: $MAT\ effect_t$, NET_{it}, and $TRMT_i$, and all other factors are as defined previously. X_{it-1} is a set of control variables that affect liquidity.[46]

Model 1 in Table 2-8 shows that the reduction in net equity trading, NET_{it}, because of FIIs' withdrawal following the MAT threat announcement, reduces the stock turnover ratios. In terms of economic significance, one basis point decline in NET_{it} leads to a 0.018% decline in *Turnover ratio*. Similarly, in Model 2 the results also suggest that the stock illiquidity increases significantly following FIIs' exit from the market, with a one basis point decline in NET_{it} leading to 0.022 points increase in the *Illiquidity index*. Finally, in Model 3, FIIs' withdrawal of funds post MAT reduces liquidity (higher value suggests lower liquidity). One basis point decline in NET_{it} leads to 1.842 points increase in the *Liquidity ratio*. Consistent with earlier studies (Bekaert and Harvey, 2002), these results show that FIIs' withdrawal reaction has negative effects on market liquidity. Based on (Amihud and Mendelson, 2000; Balakrishnan et al., 2014) this would imply an increase in the cost of capital.

[46] In terms of controls, empirical evidence suggests that firm and stock trading characteristics are the most common factors that affect stock liquidity (Chordia et al., 2000; Stoll, 2000). Specifically, evidence suggests that stock price, volatility, trading volume, market capitalization, and absolute stock return are the influential determinants of stock liquidity (see Chai et al., 2010; Lesmond, 2005; Stoll, 2000). Accordingly, we use a log of the average stock price at the end of the previous trading day to control for the effect of the price of a stock (*Stock price*). We use previous day stock return volatility, constructed as the square of daily stock return, to control for the effects of return variance (*Volatility*). We also use a log of the number of trades during the previous day (*Trades*) to control for trading volume. The log of market capitalization, in million INR, at the end of the previous trading day (*Market capitalization*), is also incorporated. We also take account of absolute stock return as an additional measure of volatility. We use the absolute value of the previous day's stock return (*Absolute return*). All these variables are sourced from the Prowess database.

2.6.3 Stock return implications of announcements and withdrawal

In this section, we examine whether MAT-related announcements and the ensuing withdrawal have any effect on stock returns. We investigate this using two different approaches. First, we examine stock market reaction by employing the standard event study method around the announcement date. Second, we study the implications of withdrawal on the pricing effect of long and short trade strategies before and after the MAT threat.

2.6.4 Abnormal returns

We investigate the stock market reaction to the key event dates by estimating the abnormal returns of treatment firms and comparing them with the control firms. We calculate the cumulative abnormal returns (CARs) using the market model for a period of 41 days centered on the event dates.[47] We use the MSCI India Index for market returns. The estimation period for the market model is from -200 to -21 days prior to the first event date to avoid the issue of overlapping of event window during the estimation window. We first present the empirical analysis for the stock market reaction on all the event dates followed by a visual inspection of the behavior of CARs around our key event date. Table 2-9 reports the market reaction to the event dates. We expect negative CARs following the event dates of February 28, April 1 and April 5, as these dates correspond to negative news associated with the applicability of MAT to FIIs.

Table 2-9, column 4 reports the CARs for firms in the treatment group and column 6 reports the CARs for firms in the control group. To test the null hypothesis that the CARs are equal to zero for a sample of *N* securities, we use parametric tests (Boehmer et al. (1991), which are reported in column 5 for the treatment group and in column 7 for the control group. Column 8 shows the difference in the CARs between the firms in the treatment and control groups. The test statistic for the difference in CARs of treatment and control firms are shown in column 9.

[47] We also use Market Adjusted Returns and find similar results.

Table 2-9: Abnormal stock returns

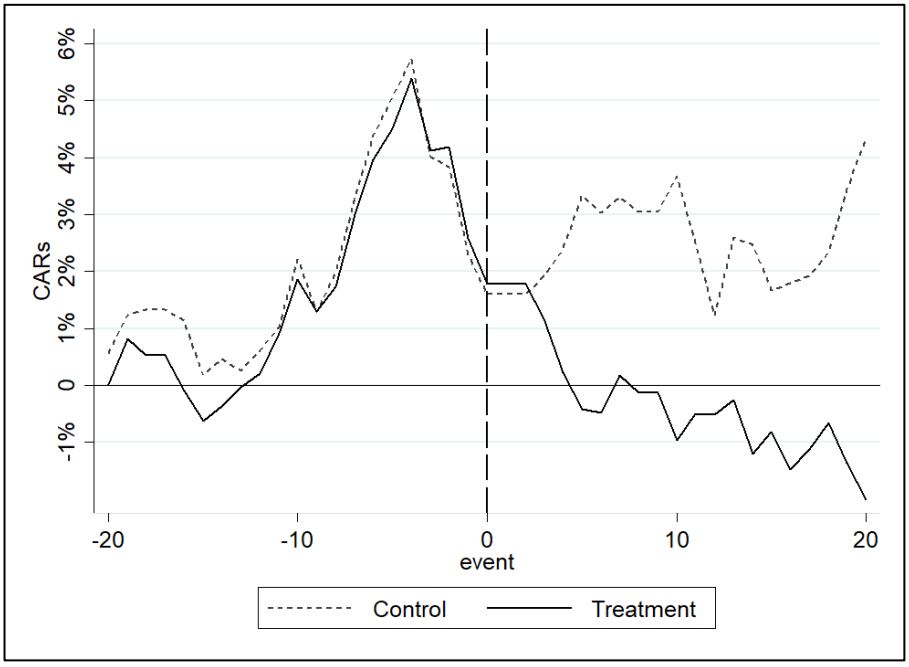
This table reports the cumulative abnormal returns (CARs) for the firms in the treatment group and for the firms in the control group around the key event dates using the market model. MSCI India Index return is used as a proxy for the market return. The estimation period is from -200 to -21 days prior to the first event date. We analyze CARs for different event periods ranging from 20 days before relevant dates and five, 10 and 20 days after the relevant dates. *t-statB* denotes the standardized cross-sectional *t*-statistics proposed by Boehmer et al. (1991). *t-stat* is the test statistics for the difference in CARs of firms in the treatment group and firms in the control group. *, **, and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

Event dates	Expected sign	Window period	Treatment	*t*-statB	Control	*t*-statB	Difference	*t*-stat
February 28, 2015	-	-20, -1	-3.04%***	-3.56	-2.90%	-1.20	-0.13%	-0.08
		1,5	-1.31%**	-2.36	-0.39%**	-2.33	-0.92%	-1.22
		1,10	-1.32%**	-2.34	-0.73%	-1.61	-0.59%	-0.51
		1,20	-3.28%**	-3.32	-1.71%*	-2.12	-1.57%***	-3.37
April 1, 2015	-	-20, -1	-1.77%***	-4.32	-1.03%	-0.44	-0.74%	-0.44
		1,5	-2.20%***	-7.38	1.73%***	4.14	-3.93%***	-7.91
		1,10	-2.75%***	-9.97	2.07%***	4.67	-4.82%***	-8.84
		1,20	-3.78%***	-9.17	2.74%***	4.95	-6.53%***	-6.03
April 5, 2015	-	-20, -1	-0.85%***	-2.01	1.64%***	2.12	-2.49%	-0.48
		1,5	-2.12%***	-8.56	1.51%***	3.89	-3.64%***	-8.44
		1,10	-2.74%***	-8.96	0.45%***	3.56	-3.19%***	-7.25
		1,20	-3.83%***	-9.50	1.87%***	4.66	-5.70%***	-7.23

With respect to our key event date, April 1, 2015, we see statistically significant negative CARs for the treatment group and significant positive CARs for the control group. The difference in CARs between the groups is statistically significant (mean difference = -6.53% for the 1-20 window period). The size of the estimated coefficient is economically meaningful, which we estimate following Kang et al. (2017). On average, the MAT threat results in the decline of shareholders' value by INR 11.37 billion (approximately US$ 0.18 billion) for a typical firm in the treatment group compared to a firm in the control group.[48] The results are similar for April 5, 2015. Overall, we find that the market reacted strongly and negatively following the key event date: April 1, 2015, i.e. the effective date.

Figure 2-5: CARs around April 1, 2015

This figure shows the CARs surrounding the key event date: 1 April 2015 for treatment and control group. Abnormal returns are computed using the market model. The MSCI India Index return is used as a proxy for the market return. The estimation period is from -200 to -21 days prior to the event date. We analyse CARs for different event periods ranging from 20 days before and five, 10 and 20 days after the event date. We calculate cumulative holdings for each sector by all FIIs from 1st January 2003 to 31st March 2015 and designate firms in the top 33rd percentile sectors as the treatment group and the bottom 33rd percentile sectors as the control group.



[48] Calculated as the difference in change in mean *Pre-MAT threat period* market capitalization 20 days prior to April 1, 2015 for the treatment group and change in mean *Pre-MAT threat period* market capitalization 20 days prior to April 1, 2015 for the control group (INR 228.39 billion × -0.0378 – INR 99.69 billion × 0.0274).

Figure 2-5 shows CARs surrounding our key event date: April 1, 2015 (vertical dashed line). The solid line represents the CARs for firms in the treatment group and the dashed line represents the CARs for firms in the control group. The graph shows the decline in the CARs after the key event date. The figure also indicates that the trend of CARs before April 1, 2015 (-20 to -1) is similar for both the treatment and control groups. However, following the key date, there is a significant deviation in CARs between the treatment and control groups. Clearly, the figure also highlights the presence of a parallel trend for the treatment and control groups before the tax threat on April 1, 2015.

2.6.5 Pricing effects

Next, we examine whether FIIs' withdrawal has any pricing effects on different trading strategies. Particularly, we evaluate whether potential trading strategies adopted before the MAT effective date would yield significantly different returns after the effective date. A possible rationale behind this strategy is that if FIIs trade less in stocks after the effective date, then the traded stocks would be underpriced. In Table 2-10, we examine a trading strategy where we take a long (short) position on the treatment (control) firms and compute the cumulative returns, as $1/w\left[\log\left(1+r_{t+w,w}\right)\right]$, where $\log\left(1+r_{t+w,w}\right) \equiv \log(1+r_{t+1}) + \cdots + \log(1+r_{t+w})$ and r_{t+1} is the return on day $t+1$, of this position over a holding period of one, five, ten, 15 and 22 trading days.[49]

As shown in Table 2-10, in the *Difference* column of Panels A and B, the cumulative stock return for the long strategy declined significantly after the MAT effective date for all the holding periods, whereas the return for the short strategy on control firms increased significantly after the MAT event for 15 and 22 trading days' holding periods. These findings suggest that long (short) strategy on more (less) affected firms yields significant negative (positive) returns potentially driven by FIIs' withdrawal following the MAT effective date.

[49] We exclude cumulative returns for each holding period, which include returns before the MAT effective date and the second announcement date. For example, for five working days, we do not include cumulative returns for five trading days before the effective date and five trading days before the second announcement. We follow this approach for the other holding periods.

Table 2-10: Pricing effects of FIIs' withdrawal

This table shows the cumulative stock return calculated as $1/w\left[\log(1+r_{t+w,w})\right]$, where $\log(1+r_{t+w,w}) \equiv \log(1+r_{t+1}) + \cdots + \log(1+r_{t+w})$ and r_{t+1} is the return on day *t+1*. We vary *w* from one to 22 trading days. Panel A shows the cumulative stock return for long strategy on treatment firms that are traded by FIIs during the sample period. Panel B shows the cumulative stock return for short strategy on control firms that are traded by FIIs during the sample period. Panel C reports the regression results of the following regression specifications:

$$\frac{1}{w}\left[\log(1+r_{t+w,w})\right] = \beta_1(MAT\ effect_t \times NET_{it}) + X_{it-1} + \gamma_i + \delta_t + \varepsilon_{it}$$

The *Pre-MAT threat period* is January 1-March 31, 2015 and the *MAT threat period* is April 1-August 31, 2015. *Difference* shows the difference between the *MAT threat period* and the *Pre-MAT threat period* average values. Standard errors are reported in the column *Std. error*. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively. $MAT\ effect_t$ is the dummy variable which takes the value of 0 in the *Pre-MAT threat period* (January 1-March 31, 2015) and 1 in the *MAT threat period* (April 1-August 31, 2015). NET_{it} is the net equity trading scaled by previous day market capitalization (in pbs units). X_{it-1} is the set of control variables defined in Appendix 2-1. γ_i is the vector of firm dummies controlling for firm fixed effects. δ_t controls time (day) effects. ε_{it} is the error term. Standard errors are corrected for clustering at the firm level and time (day) level. Panel C.1. shows the regression results for cumulative stock returns for the long strategy on treated firms traded by FIIs during the sample period. Panel C.2. shows the regression results for cumulative stock returns for the short strategy on control firms traded by FIIs during the sample period. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively. The sample period ranges from January 1, 2015 to August 31, 2015.

Panel A. Long strategy on treatment firms

Stock return (%) for long Strategy on treatment firms							
Window period	Overall mean	Overall median	Overall SD	Pre-MAT threat period mean (1)	Post-MAT threat period mean (2)	Difference (2) - (1)	Std. error
One trading day	-0.006	-0.020	2.932	-0.037	-0.031	-0.068***	0.023
Five trading days	-0.072	-0.059	1.297	-0.033	-0.094	-0.061***	0.011
Ten trading days	-0.011	-0.017	0.846	-0.021	-0.004	0.017***	0.007
15 trading days	-0.045	-0.039	0.724	-0.014	-0.061	-0.046***	0.006
22 trading days	-0.076	-0.067	0.607	-0.001	-0.103	-0.101***	0.006

Panel B. Short strategy on control firms

Stock return (%) for short strategy on control firms							
Window period	Overall mean	Overall median	Overall SD	Pre-MAT threat period mean (1)	Post-MAT threat period mean (2)	Difference (2) - (1)	Std. error
One trading day	-0.105	0.000	3.230	-0.135	-0.087	0.049	0.058
Five trading days	0.033	0.058	1.374	0.008	0.047	0.039	0.026
Ten trading days	0.020	0.015	0.755	0.004	-0.020	-0.024	0.018
15 trading days	-0.011	-0.000	0.895	-0.009	0.035	0.045***	0.015
22 trading days	0.034	0.036	0.603	-0.024	0.055	0.080***	0.013

Panel C.1. Long strategy on treatment firms

	One trading day	Five trading days	Ten trading days	15 trading days	22 trading days
$MAT\ effect_t \times NET_{it}$	0.184***	0.026***	0.006***	0.001	-0.002
	(12.78)	(5.13)	(2.95)	(0.10)	(-0.95)
Stock return	0.036	-0.008	-0.010	-0.012**	-0.004
	(1.49)	(-0.80)	(-1.55)	(-2.09)	(-1.09)
Market capitalization	-0.236***	-0.233***	-0.194***	-0.207***	-0.203***
	(-3.09)	(-4.15)	(-3.85)	(-4.12)	(-4.88)
Price-to-Book ratio	-0.264***	-0.228***	-0.207***	-0.209***	-0.196***
	(-4.62)	(-5.64)	(-7.27)	(-7.23)	(-7.27)
Turnover ratio	-0.001	-0.001	-0.001*	-0.001	-0.000
	(-0.79)	(-1.32)	(-1.78)	(-0.77)	(-0.05)
Volatility	-0.176	-0.150**	-0.068	-0.094**	-0.060*
	(-1.58)	(-2.35)	(-1.44)	(-2.38)	(-1.90)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Time (day) fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.100	0.132	0.176	0.222	0.253
Number of firms	532	528	500	511	519
Number of observations	61,876	58,832	50,332	51,612	53,847

Panel C.2. Short strategy on control firms

	One trading day	Five trading days	Ten trading days	15 trading days	22 trading days
$MAT\ Effect_t \times NET_{it}$	-0.224***	-0.042***	-0.002	-0.002	-0.003
	(-5.83)	(-2.81)	(-0.20)	(-0.32)	(-0.58)
Stock return	-0.053	-0.009	0.012	0.008	0.005
	(-1.69)	(-0.73)	(1.45)	(1.06)	(1.07)
Market capitalization	0.878**	0.684***	0.707***	0.633***	0.520***
	(2.71)	(3.24)	(3.12)	(3.22)	(3.07)
Price-to-Book ratio	0.246**	0.236**	0.302***	0.226***	0.148*
	(2.46)	(2.59)	(5.56)	(3.27)	(1.99)
Turnover ratio	0.153	0.098	-0.041	-0.010	0.018
	(0.61)	(0.96)	(-0.55)	(-0.17)	(0.27)
Volatility	-0.533	0.065	0.006	-0.068	0.145
	(-0.79)	(0.24)	(0.03)	(-0.51)	(1.24)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Time (day) fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.105	0.118	0.154	0.184	0.191
Number of firms	100	100	98	100	99
Number of observations	9,904	9,422	8,075	8,210	8,533

We also run the following daily panel fixed effect regression for treated and control firms to evaluate the pricing effect (see Gao and Lin, 2015):

$$\frac{1}{w}\left[\log\left(1+r_{t+w,w}\right)\right] = \beta_1(MAT\ effect_t \times NET_{it}) + X_{it-1}+\gamma_i + \delta_t + \varepsilon_{it}, \quad w = 1,5,10,15,22 \tag{2-12}$$

where $\log\left(1+r_{t+w,w}\right) \equiv \log(1+r_{t+1}) + \cdots + \log(1+r_{t+w})$ and r_{t+1} is the return

on day *t+1*. We express cumulative returns as a percentage. We vary *w* from one to 22 trading days. $MAT\ effect_t$ and NET_{it} are defined in the previous section. X_{it-1} is a vector of control variables, discussed in the following paragraph. γ_i and δ_t represent firm fixed effects and time (day) fixed effects, respectively.

The first control variable that we include is previous day's stock return (*Stock return)* as Brennan et al. (1998) suggest that past stock returns affect expected returns. Similarly, research shows that stock expected returns are negatively related to the size and the price-to-book ratio (see Fama and French, 1995; Jensen et al., 1997). Correspondingly, we include a log of the previous day's *Market capitalization* and the previous day's *Price-to-book ratio*. Further, Chordia et al. (2001) and Amihud (2002) find a negative relation between stock returns and liquidity measures. Thus, we include the previous day's *Turnover ratio* as a proxy for the liquidity measure. The previous day's daily *Volatility*, as a measure of total risk, is also incorporated.

We report the regression results of Equation (2-12) in Panel C of Table 2-10. In Panel C.1., we regress cumulative stock returns for the long strategy on treated firms traded by FIIs and in Panel C.2., we regress cumulative stock returns for the short strategy on control firms traded by FIIs. The key conclusion is that the $MAT\ effect_t$ coefficient is positive and statistically significant for the long strategy for treated firms for one, five, and ten trading days' holding periods. The short strategy in control firms yields significant negative returns for one day and five trading days. We also perform a similar trading strategy using the alternative treatment and controls groups (as discussed in Sections 2.5.3 and 2.5.3) and observe similar results (available from the authors on request). In summary, our results suggest that the MAT threat and the subsequent FIIs' exit produces a significant pricing effect in both the long and short strategies over short-term periods up to ten days.

2.7 Elimination of MAT threat and FIIs' market re-entry

In this section, we examine the FIIs' trading reaction following the elimination of the MAT threat. Our theoretical framework suggests that FIIs' trading should increase, or at least outflow should reduce, after the reversal of the MAT threat. We examine this in two ways. First, we conduct a simple paired *t*-test for the mean differences in NET_{it}

before and after the second announcement, removing the MAT threat on September 1, 2015 and using five different window periods (similarly to Table 2-3). We denote the period after the second announcement as the *Post-MAT threat period.* Here, our sample period ranges from April 1, 2015 to December 31, 2015.

The results in Panel A of Table 2-11 show the FIIs' trading flows are still negative after the clarification of the MAT rules, but the size of the outflows has reduced, as evidenced by the positive mean differences. However, what is striking about these univariate results is that, compared to the exit reaction, the elimination of the MAT threat does not lead to an immediate and material inflow of FIIs, rather only the pace of the FIIs' investment outflow reduces.

Second, we also run the DiD using Equation (2-13) for different window periods without control variables and for the *Sample period* with control variables:

$$NET_{it} = \beta(MAT\ reversal\ effect_t \times TRMT_i) + X_{it-1} + \gamma_i + \delta_t + \varepsilon_{it} \qquad (2\text{-}13)$$

In Equation (2-13), $MAT\ reversal\ effect_t$ is the dummy variable which takes the value of 0 in the *MAT threat period* and the value of 1 in the *Post-MAT threat period* for different window periods. All other variables are as previously defined. The results in Panel B of Table 2-11 show the coefficients of the main variable of interest are positive but not statistically significant. If we consider the economic significance, we see that compared to the models on withdrawal (a decline of 0.309 basis points, as reported in Table 2-4, Panel B), the DiD coefficients, β, show an increase of 0.047 basis points. Economically, this translates into a small daily increase of INR 1.08 million market capitalization for each equity, compared to a withdrawal of INR 7.27 billion during the initial announcement. These results suggest that though FIIs are quick to move out of the Indian market when reacting to the threat of unfavourable tax policies, reversal of the change in policies does not lead to immediate and equally substantial inflows of FIIs.

Table 2-11: MAT policy reversal and FIIs' market re-entry

This table shows the impact of MAT policy reversal on FIIs' net equity trading. Panel A shows the paired *t*-test of the differences in average daily net equity trading value as a percentage of previous day market capitalization (reported in pbs units) of listed stocks in BSE/NSE by all FIIs. The column *Window period* denotes different periods of trading days (similar to Table 2-3). The *MAT threat period* column shows the average value for the corresponding trading window period before the second announcement on MAT reversal (i.e. September 1, 2015) and the *Post-MAT threat period* column shows the average value of the corresponding trading window after the second announcement of September 1, 2015. Panel B reports the regression results of the following regression specification for different window periods:

$$NET_{it} = \beta(MAT\ reversal\ effect_t \times TRMT_i) + X_{it-1} + \gamma_i + \delta_t + \varepsilon_{it}$$

where: NET_{it} is the day *t* net trading value by all FIIs as a percentage of the previous day's market capitalization of listed stocks *(i)* on the Indian stock market (reported in pbs units). $MAT\ reversal\ effect_t$ is the dummy variable which takes the value of 0 in the *MAT threat period* and the value of 1 in the *Post-MAT threat period* for seven trading days, one month, two months, three months and the sample period. Window periods are similar to Table 2-3. $TRMT_i$ is the dummy variable which takes the value of 1 for the treatment group and 0 for the control group. X_{it-1} is the vector of control variables defined in Appendix 2-1. γ_i is the vector of firm dummies controlling for firm fixed effects. δ_t controls time (day) fixed effects. ε_{it} is the error term. Standard errors are corrected for clustering at the firm level and time (day). Panel C reports the cumulative abnormal returns (CARs) for the firms in the treatment group and for the firms in the control group around the second announcement. The MSCI India Index return is used as a proxy for the market return. The estimation period is from -200 to -21 days prior to the relevant dates. We analyze CARs for different event periods ranging from 20 days before the relevant dates and five, 10 and 20 days after the relevant dates. *t-statB* denotes the standardized cross-sectional *t*-statistics proposed by Boehmer et al. (1991). *t-stat* is the test statistics for the difference in CARs of firms in the treatment group and firms in the control group. *, **, and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

Panel A: Mean differences in FIIs' net equity trading following policy reversal

Window period	MAT threat period (1)	Post-MAT threat period (2)	Difference (2) - (1)	*t*-stat	Std. error	Observations
Seven trading days	-0.531	-0.406	0.125***	4.044	0.031	10,063
One month	-0.202	-0.171	0.030	0.921	0.033	29,340
Two months	-0.119	-0.060	0.058***	2.528	0.023	58,528
Three months	-0.177	-0.065	0.111***	5.635	0.020	87,181
Sample period	-0.140	-0.022	0.118***	7.364	0.016	129,659

Panel B: Different period-based Difference-in-Difference regression results

	Seven trading days	One month	Two months	Three months	Sample period	Sample period
$MAT\ reversal\ effect_t$	0.267	0.0177	0.0614	0.103	0.110	0.047
$\times\ TRMT_i$	(0.84)	(0.13)	(0.76)	(1.57)	(1.38)	(0.37)
Stock return						0.093***
						(13.61)
Market return						0.003
						(0.18)
Market volatility						-0.585**
						(-2.29)
US$ volatility						-2.481
						(-0.99)
EM return						-0.070
						(-0.26)
World return						0.145
						(0.29)
US TB rate						-0.877**
						(-2.37)
EM VIX return						-0.010**
						(-2.11)
Global VIX return						0.001
						(0.35)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time (day) fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.233	0.176	0.134	0.120	0.107	0.113
Number of firms	561	683	763	832	891	883
Number of observations	8,543	25,160	50,286	74,758	111,071	107,908

Panel C: Abnormal Return

Event dates	Expected sign	Window period	Treatment	*t*-statB	Control	*t*-statB	Difference	*t*-stat
September 1, 2015	+	-20, -1	2.28%**	2.36	1.79%	0.66	0.50%**	2.26
		1,5	0.34%**	2.42	0.82%	0.27	-0.49%	-0.70
		1,10	2.21%***	3.49	0.46%*	1.66	1.74%***	3.73
		1,20	5.54%***	6.05	2.64%**	2.67	2.90%***	3.77

To further supplement these findings showing a subdued return to the market, we also conduct an event study and report the CARs, centered on the second announcement, in Panel C. We expect a positive but quantitatively similar market reaction in terms of magnitude of CAR compared to negative CARs during outflows. Though we find a positive excess market reaction, the absolute effect is lower compared to the initial effect on April 1. For example, the differential CAR at the 1-20 window period is 2.90%, which is statistically significant, compared to -6.53% on April 1. In terms of economic magnitude, on average, the reversal of the MAT threat results in an increase of shareholders' value by INR 9.44 billion (approximately US$ 0.15 billion), compared to INR 11.37 billion loss of shareholders' value after the MAT threat, for a typical firm in the treatment group compared to a firm in the control group.[50]

2.8 Conclusion

FIIs play an important role in supplying funding and liquidity in the capital constrained emerging markets, which motivates policymakers to attract and retain FIIs. Given their importance in the capital market, the literature suggests that FIIs can indirectly influence policymaking through their ability to pressurize shareholders and managers of the firms in which they invest to make representations on their behalf for favourable investment policies. However, we suggest that when changes in policy of the host government are detrimental to FIIs' prospects, they could potentially institute policy changes by their market power, i.e. by withdrawing from the market and causing disruptive effects to the market. We exploit an unexpected change in tax policy (known as MAT) that threatened to impose retrospective taxes on FIIs to not only examine FIIs' reaction in response to the threat of MAT but also to consider the implications of market avoidance by FIIs.

We find during the *MAT threat period*, there was economically significant market abandonment by FIIs. This constitutes, on average, an outflow of almost INR

[50] Calculated as the difference in change in mean *MAT threat period* market capitalization 20 days prior to September 1, 2015 for the treatment group and change in mean *MAT threat period* market capitalization 20 days prior to September 1, 2015 for the control group (INR 217.10 B × 0.0554 – INR 98.05 B × 0.0264).

7.27 million per day per equity (around US$ 0.12 million). Further, we also find that the effect of the impeding tax liability was immediate, as FIIs withdraw from the market within the first seven trading days after the MAT effective date. This dramatic response of FIIs to exit the market also has disruptive effects on stock liquidity, volatility, returns, and pricing. These effects, driven by a sudden and unexpected outflow of FIIs, could have played a key role in forcing the government to reverse the proposed MAT change. Further, our results also indicate that the elimination of the threat by the government does not lead to immediate and materially substantive inflows compared to the exit reaction.

To conclude, our study implies that tax advantage is one the important attractions of FIIs in emerging markets. FIIs are highly sensitive to tax policies and any change that increases their explicit tax liability could result in severe withdrawal of funds in emerging markets. This is a direct channel through which FIIs could influence government policies to suit their own preferences. Although FIIs in emerging markets may quickly pull out of the market in the case of an unfavourable tax policy, they do not move back into the market with the same speed following the reversal of changes in policies. This suggests that policymakers should take due care in formulating, announcing and implementing policies that could have a direct effect on the expected payoff of FIIs if they wish to attract and retain FIIs.

Appendix 2-1: Control variables

Table A2-1: Brief description of control variables

Variable	Definition	Sources
Stock return	The previous day's return of individual firms that FIIs trade on a particular day on the NSE and/or BSE. The returns data provided in Prowess include dividend and capital gains, i.e. they are total returns	Prowess database maintained by the Centre for Monitoring Indian Economy (CMIE)
Market return	The previous day's return on the NSE or BSE index	NSE and BSE
Market volatility	The daily standard deviation calculated using previous 90 days' return on BSE or NSE	NSE and BSE
US$ volatility	The daily standard deviation of the exchange rate using the previous 90 days' figures	Reserve Bank of India
Real GDP growth rate	The last quarter's real gross domestic product growth rate	Thomson Reuters
EM return	The previous day's return on the MSCI Total Emerging Market Index	Thomson Reuters
World return	The previous day's return on the MSCI Total World Market Index	Thomson Reuters
US TB rate	The previous day's return on one-year US Treasury Bill rate	Thomson Reuters
EM VIX return	The previous day's return on the Global VIX index. This index is based on the one-month model-free implied volatility of the S&P 500 equity index	Thomson Reuters
Global VIX return	The previous day's return on the Emerging Market Volatility Index	Thomson Reuters
Volatility	The previous day's stock return volatility (square of stock return)	Prowess
Turnover ratio	The ratio of the number of shares traded to number of shares outstanding on the previous day	Prowess
Market capitalization	The log of market capitalization at the end of the previous day	Prowess
Price-to-book ratio	The ratio of previous day stock price of the firm to previous day book value per share	Prowess
Illiquidity index	Index for illiquidity developed by Amihud (2002)	Derived (Appendix 2-3)
Prices	The log of average price of the stock at the end of the previous day	Prowess
Trades	The log of number of trades during the previous day	Prowess
Absolute return	The previous day's absolute stock return	Prowess

Appendix 2-2: Correlation Matrix

The table presents the correlation matrix for the control variables included in the empirical analysis. Please see Appendix 2-1 for variable definition. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Stock return	(1)	1									
Market return	(2)	0.419***	1								
Market volatility	(3)	-0.342***	-0.723***	1							
US$ volatility	(4)	0.029	-0.019***	-0.147***	1						
Real GDP growth rate	(5)	0.000	0.037	-0.043	0.324***	1					
World return	(6)	0.256***	0.26***	-0.185***	0.075***	0.146***	1				
EM return	(7)	0.214***	0.42***	-0.145***	0.144***	0.0732	0.206***	1			
US TB rate	(8)	-0.033	-0.096	0.0412	-0.211***	-0.387***	-0.163**	-0.159***	1		
EM VIX return	(9)	-0.249**	-0.29**	0.615***	-0.107***	-0.057	-0.209***	-0.357***	0.074***	1	
Global VIX return	(10)	-0.215**	-0.32**	0.246***	-0.162***	-0.032	-0.334***	-0.370***	0.113***	0.398***	1

Appendix 2-3: Measures of volatility and liquidity

Volatility: We use the Black and Scholes (1973) formulae for the European style at-the-money (ATM) options with the assumption of no dividend.[51] Since the call and the put stock options trading on NSE and BSE are European style options, this simple model can very well be used in this study. The data on stock call and put options are collected from the BSE and NSE websites. The call (c) and put (p) option valuation formulae are:

$$\begin{aligned} c &= S \times N(d_1) - X\, e^{-rT} N(d_2) \text{ and} \\ p &= X\, e^{-rT} N(-d_2) - S \times N(-d_1) \end{aligned} \tag{A2.1}$$

where

$$d_1 = \frac{\ln\left(S \times \frac{e^{rT}}{X}\right) + 0.5\sigma^2 T}{\sigma\sqrt{T}} \text{ and } d_2 = d_1 - \sigma\sqrt{T}.$$

In Equation (A2.1): S is the current price of call/put option, X is the option's exercise/strike price, T is the options' time to expiration, r is the risk-free rate of interest [52] and N (.) is the normal cumulative density function. Given the price of call and put, we estimate the annualized IV (σ) using Bisection method.[53] Daily IVs are calculated by dividing annualized IV by root of 252.

Liquidity: The first firm level liquidity measure is the turnover ratio for stock i at time t and is computed as:

$$Turnover\ ratio_{it} = \frac{Number\ of\ shares\ traded_{it}}{Number\ of\ shares\ outstanding_{it}} \tag{A2.2}$$

Second, following Amihud (2002) we estimate the daily index of illiquidity for stock i at time t as:

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[51] By convention, a call option is said to be ATM if Stock price/Exercise price ϵ (0.97, 1.03). For put option, we replace Stock price/Exercise price by Exercise price/stock Price.

[52] We use 91-days Indian T-bills rate. The rate is sourced from Reserve Bank of India (RBI).

[53] We use tolerance level of 0.000001.

$$Illiquidity\ index_{it} = \frac{|R_{it}|}{V_{it}} \quad \text{(A2.3)}$$

where R_{it} is the return of stock *i* at time *t,* and V_{it} is the daily volume of stock *i* at time *t.* The index is then multiplied by 10^6. A higher value of illiquidity index indicates lower stock liquidity.

The third proxy we use is based on Hui and Heubel (1984) where the daily measure is calculated as:

$$Liquidity\ ratio_{it} = \frac{(P_{max} - P_{min})/P_{min}}{V/(S.\bar{P})} \quad \text{(A2.4)}$$

where P_{max} is the highest daily price in the last 5-day period, P_{min} is the lowest daily price in the last 5-day period, V is the total volume of stock *i* traded over the 5-day period, *S* is the total number of shares outstanding over the same period and $\bar{P}$ is the average closing price over the same period. A higher value of the liquidity ratio indicates lower stock liquidity. All the variables used to study the potential implications are sourced from the Prowess database.

Appendix 2-4: MAT threat: Baseline regression results

This section relates to Section 2.5.1. of the main text. Here, we present the baseline regression results to show the effect of tax threats on net equity trading by FIIs. We use the following general equation to run a daily fixed effect panel data regression model based on different time periods:

$$NET_{it} = \beta(MAT\ effect_t) + \gamma_i + \varepsilon_{it} \quad \text{(A2.5)}$$

In Equation (A2.5), NET_{it} is the day *t* net trading value by all FIIs as a percentage of the previous day's market capitalization of listed stocks *(i)* on the Indian stock market. $MAT\ effect_t$ is the dummy variable, which takes the value of 1 in the *MAT threat period* and 0 in the *Pre-MAT threat period* for each window period. γ_i is the vector of firm dummies controlling for firm fixed effects and ε_{it} is the error term. We also cluster all the standard errors at firm level. β captures any change in NET_{it} caused by the threat of MAT.

The results in Table A2-2 are in line with our prediction that the threat of MAT has a significant negative effect on the trading activities of FIIs. The effect during the *Seven trading days* window period is negative 0.238 basis points (daily market capitalization of approximately INR 5.73 million per share), and further declines to negative 0.396 basis points (daily market capitalization of approximately INR 9.35 million per share (approximately US$ 0.15 million)) for the *One month* window period. The coefficient is also more negative for other window periods compared to the first *Seven trading days'* period.

Next, we estimate different specifications of Equation (A2.6), during the *Sample period,* controlling for other competing factors that could provide alternative explanations:

$$NET_{it} = \beta(MAT\ effect_t) + X_{it-1} + \gamma_i + \varepsilon_{it} \quad \text{(A2.6)}$$

In Equation (A2.6), X_{it-1} is a set of control variables discussed in Section 2.4.2

of the main text. To control for firm-level heterogeneity, we use firm fixed effects (γ_i). We also cluster our standard error at the firm level.

The results, estimating different specifications of Equation (A2.6) with various control variables, are presented in Table A2.2. In Model 1, we use the dummy variable $MAT\ effect_t$ and stock returns, and in Model 2, we incorporate the dummy variable, stock returns and the pull factors. Finally, in Model 3, we incorporate the remaining control variables. In all models, our main variable of interest, $MAT\ effect_t$, enters the regressions with statistically significant (at the 1% level of significance) coefficients ranging from -0.318 to -0.362. The effect is not only statistically but also economically material as it leads to a withdrawal in the range of INR 7.49 to INR 8.52[54] million market capitalization per day per share (around US$ 0.12 million to US$ 0.13 million). This sizeable drop in NET_{it} is consistent with the prediction of our framework that tax threats lead to investment outflows resulting in the inefficient allocation of portfolios.

[54] Calculated as -0.318 and -0.362 basis points of daily average market capitalization of each equity during the *MAT threat period*, which is around INR 235.41 billion.

Table A2-4: Regressions for different window periods

This table reports the regression results of the following regression specification for different window periods:

$$NET_{it} = \beta(MAT\ effect_t) + \gamma_i + \varepsilon_{it}$$

where: NET_{it} is the day *t* net trading value by all FIIs as a percentage of the previous day's market capitalization of listed stocks *(i)* on the Indian stock market (reported in pbs units). $MAT\ effect_t$ is the dummy variable which takes the value of 0 in different windows of the *Pre-MAT threat period* and 1 for different windows of the *MAT threat period*. For *Seven trading days*, we use seven trading days' data before April 1, 2015 for the *Pre-MAT threat period* and seven trading days' data after April 1, 2015 for the *MAT threat period*. The case for *One Month, Two Months* and *Three Months'* window periods is similar. For the *Sample period*, we use January 1 to March 31, 2015 for the *Pre-MAT threat period* and April 1, 2015 to August 31, 2015 for the *MAT threat period*. γ_i is the vector of firm dummies controlling for firm fixed effects. ε_{it} is the error term. Standard errors are corrected for clustering at the firm level. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

	Seven trading days	One month	Two months	Three months	Sample period
$MAT\ effect_t$	-0.238***	-0.396***	-0.314***	-0.325***	-0.354***
	(-3.36)	(-6.81)	(-6.20)	(-6.86)	(-8.05)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.231	0.198	0.159	0.136	0.121
Number of firms	716	804	884	943	1,041
Number of observations	13,986	28,375	55,827	85,023	116,794

Table A2-5: MAT effect regressions

This table reports the regression results of the following regression specification for the *Sample period*:

$$NET_{it} = \beta(MAT\ effect_t) + X_{it-1} + \gamma_i + \varepsilon_{it}$$

where NET_{it} is the day *t* net trading value by all FIIs as a percentage of the previous day's market capitalization of listed stocks *(i)* on the Indian stock market (reported in pbs units). $MAT\ effect_t$ is the dummy variable which takes the value of 0 in the *Pre-MAT threat period* (January 1-March 31, 2015) and 1 in the *MAT threat period* (April 1-August 31, 2015). X_{it-1} is the set of control variables discussed in Section 2.4.2 of the main text. γ_i is the vector of firm dummies controlling for firm fixed effects. ε_{it} is the error term. Standard errors are corrected for clustering at the firm level. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively. The sample period ranges from January 1, 2015 to August 31, 2015.

	(1)	(2)	(3)
$MAT\ effect_t$	-0.362***	-0.349***	-0.318***
	(-5.47)	(-5.39)	(-5.14)
Stock return	0.103***	0.104***	0.105***
	(15.48)	(13.96)	(13.62)
Market return		0.038	0.005
		(1.20)	(0.15)
Market volatility		-0.645**	-0.575**
		(-2.14)	(-2.10)
US$ volatility		-3.497*	-5.289**
		(-1.99)	(-2.66)
Real GDP growth rate		0.012	0.007
		(1.09)	(0.59)
EM return			0.451
			(1.54)
World return			-0.552
			(-0.78)
US TB rate			-2.549***
			(-3.68)
EM VIX return			0.002
			(0.38)
Global VIX return			-0.005
			(-1.09)
Firms' fixed effects	Yes	Yes	Yes
Adjusted R^2	0.127	0.128	0.128
Number of firms	1,039	1,032	1,032
Number of observations	116,789	114,286	114,286

Appendix 2-5: Timing of the event: February 28, 2015

This table reports the results for NET_{it} in response to the February 28, 2015 announcement. Panel A shows the paired *t*-test of the differences in average value of NET_{it} between *Pre* and *Post-Feb 28, 2015* for different window periods. NET_{it} is the day *t* net trading value by all FPIs as a percentage of the previous day's market capitalization of listed stocks (*i*) on the Indian stock market (in bps). The column *Window period* denotes the different period of trading days. The column *Pre-Feb 28, 2015* shows the average value for the corresponding trading window before February 28, 2015 and *Post-Feb 28, 2015* shows the average value of corresponding trading window after February 28, 2015. The column *Difference* shows the difference between *Pre-* and *Post-Feb 28, 2015* average values. *t-stat* is the *t*-statistics of the difference figure with a probability of the alternative hypothesis that the average difference is less than 0 (i.e. Pre – Post-Feb 28, 2015<0). Standard errors are reported in the column *Std. error*. The column *Observations* shows the sample size included in each window. Panel B shows the difference-in-differences in NET_{it} for one-month period. *Treatment* represents the firms in the treatment group and *Control* represents firms in the control group. We calculate total cumulative holdings for each sector by all FPIs from January 1, 2003 to Feb 28, 2015 and designate firms in the top tercile sectors as the treatment group and the bottom tercile sectors as the control group. Panel C reports the regression results of the difference-in-differences. The dependent variable is NET_{it}. $Feb\ 28\ effect$ is a dummy variable that takes value of zero for one-month before and one in one-month after February 28, 2015. $TRMT_i$ is the dummy variable that takes the value of zero for the control group and one for the treatment group. The use of control variables, firm fixed effects and time (day) fixed effects are as indicated. Control variables are same as Table 2-4 of the main text. Standard errors are corrected for clustering at the firm level and time (day). *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

Panel A: Net equity trading

Window periods	Pre-Feb 28, 2015 (1)	Post-Feb 28, 2015 (2)	Difference (2) - (1)	*t*-stat	Std. Error	Observations
Seven trading days	0.3618	0.3943	0.0325	0.540	0.060	9,446
One month	0.3752	0.3873	0.0122	0.448	0.030	28,248

Panel B: Mean difference-in-differences

	Pre-Feb 28, 2015 (1)	Post-Feb 28, 2015 (2)	Differences (2) - (1)	*t*-stat	Std. error
Treatment	0.1668	0.1994	0.0326	0.983	0.033
Control	0.1273	0.1291	0.0018	0.889	0.002
Differences (Pre-Feb 28)	0.0395			1.186	0.033
Differences (Post-Feb 28)		0.0703		1.891	0.037
Difference-in-differences			0.0308	0.360	0.086

Panel C: Difference-in-differences regression

	Seven trading Days (1)	Seven trading Days (2)	One Month (3)	One Month (4)
$Feb28\ effect$	0.0858		0.0923	
	(1.19)		(1.22)	
$Feb28\ effect_t \times TRMT_i$		0.0784		0.0054
		(0.94)		(0.04)
Control Variables	No	No	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time (day) fixed effects	No	Yes	No	Yes
Adjusted R^2	0.313	0.313	0.234	0.244
Number of firms	666	549	784	652
Number of observations	9,382	7,915	27,502	23,219

Appendix 2-6: MAT related announcements on 2010 and 2012

This table reports the results for NET_{it} in response to the July 23, 2010 and August 14, 2012 events. Panel A shows the paired *t*-test of the differences in average value of NET_{it} between *Pre* and *Post-July 23, 2010 (August 14, 2012)* for different window periods. NET_{it} is the day *t* net trading value by all FPIs as a percentage of the previous day's market capitalization of listed stocks (i) on the Indian stock market (reported in bps). The column *Window period* denotes the different period of trading days. The column *Pre-July 23, 2010 (August 14, 2012)* shows the average value for the corresponding trading window before July 23, 2010 (August 14, 2012) and *Post-July 23, 2010 (August 14, 2012)* shows the average value of corresponding trading window after July 23, 2010 (August 14, 2012). The column *Difference* shows the difference between *Pre* and *Post* average values. *t-stat* is the *t*-statistics of the difference figure with a probability of the alternative hypothesis that the average difference is less than 0 (i.e. Pre – Post<0). Standard errors are reported in the column *Std. error*. The column *Observations* shows the sample size included in each window. Panel B Panel C reports the regression results of the difference-in-differences. The dependent variable is NET_{it}. $July_{2010}(August_{2012})$ is a dummy variable that takes value of zero for one-month (models 1 and 3) or three months (models 2 and 4) before and one in one-month (models 1 and 3) or three months (models 2 and 4) after July 23, 2010 (August 14, 2012). $TRMT_i$ is the dummy variable that takes the value of zero for the control group and one for the treatment group. We calculate total cumulative holdings for each sector by all FPIs from January 1, 2003 to July 23, 2010 (August 14, 2012) and designate firms in the top tercile sectors as the treatment group and the bottom tercile sectors as the control group. We include control variables, firm fixed effects and time (day) fixed effects. Control variables are same as Table 2-4 of the main text. Standard errors are corrected for clustering at the firm level and time (day). *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

Panel A: Differences in net equity trading

Panel A1: July 23, 2010

Window period	Pre-July 23, 2010 (1)	Post-July 23, 2010 (2)	Diff (2) - (1)	*t*-stat	Std. error	Observations
One month	0.287	0.444	0.157**	2.69	0.058	24,591
Three months	0.219	0.510	0.291***	3.13	0.093	73,250

Panel A2: August 14, 2012

Window period	Pre-August 14, 2012 (1)	Pre-August 14, 2012 (2)	Diff (2) - (1)	*t*-stat	Std. Error	Observations
One month	0.140	-0.136	-0.276***	-4.23	0.065	22,845
Three months	0.157	-0.023	-0.180***	-2.99	0.060	69,015

Panel B: Difference-in-differences regression results

	One month (1)	Three months (2)	One month (3)	Three months (4)
$July_{2010} \times TRMT_i$	0.197**			
	(2.37)			
$July_{2010} \times TRMT_i$		0.198**		
		(2.33)		
$August_{2012} \times TRMT_i$			-0.192**	
			(-2.44)	
$August_{2012} \times TRMT_i$				-0.124**
				(-2.34)
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time (day) fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.146	0.154	0.135	0.135
Number of firms	624	801	624	794
Number of observations	20,285	60,643	18,697	56,884

Chapter 3. Do foreign institutional investors mimic the insiders' trades?

3.1 Brief introduction

A large body of literature documents that FIIs are at information disadvantage compared to domestic institutional investors (Brennan and Cao, 1997; Choe et al., 2005; Dvořák, 2005; Hau, 2001). Such information asymmetry is even more severe in emerging markets as ownership concentration is widespread, and insider trading is prevalent due to poor investor protection and weak enforcement of insider trading regulations. On the flip side, corporate insiders, such as managers and members of the board of directors, possess superior private information about their company than do their counterparts, (small) outside shareholders (Fidrmuc et al., 2006). Hence, their trade could convey superior and useful information to outsiders as they have better knowledge about firm future cash flows and can time the market (Ke et al., 2003; Piotroski and Roulstone, 2005; Tirapat and Visaltanachoti, 2013). In this empirical investigation, we argue that FIIs can improve their investment performance by exploiting information content of insiders' trades.

Recent literature finds that not all insiders' trades are informative. These studies show that opportunistic insiders' trades convey information about firm' future performance whereas routine insiders' trades are predictable and driven by hedging, diversification, or liquidity needs. Considering information disadvantage of FIIs in emerging markets and superior information content of opportunistic insiders' trades, in this study, we examine two key issues: Do FIIs mimic the trading direction of opportunistic insiders' trades? Do FIIs who mimic earn significant abnormal returns in doing so? To support these two key questions, we first examine the information content of insiders' trades.

In summary, we find evidence of FIIs mimicking opportunistic insiders' buy transactions (within 15 trading days). We also find that existing FIIs, who hold the shares in their portfolio, and new FIIs, who did not hold the shares in their portfolio before, are the ones who mimic the opportunistic buy trades by insiders. We also find that FIIs can significantly improve their investment performance as they can earn

significant abnormal return by mimicking insiders' trades.

Our study makes two important contributions. First, to the best of our knowledge, this is a first study to segregate insiders' trades in emerging markets into opportunistic and routine insiders' trades and examine their information content. Second, we also contribute to the literature that focuses on outside investors' response to insider trades (Bettis et al., 1997; Chang and Suk, 1998; Cornell and Sirri, 1992). We build on Cohen et al. (2012b) who provide suggestive evidence that institutional investors follow past opportunistic trades. Our study extends existing literature by documenting the FIIs' response to opportunistic insider trading. As FIIs are generally less informed than domestic institutional investors, they view opportunistic insider trading as an indication of information about the firm future performance. Our evidence that FIIs mimic past opportunistic trades contributes to this line of literature.

A more detailed discussion of the questions, findings and contributions is in Section 1.3.2 and Section 1.4.2. The rest of the paper is organised as follows. A brief discussion of insider trading regulation in India is discussed in Section 3.2 and a review of literature and hypothesis is presented in Section 3.3. Section 3.4 discusses the dataset and provides a summary of the variables used in this study. Empirical results of the associated robustness tests are discussed in Section 3.5. Section 3.6 concludes the paper.

3.2 Insider trading regulation in India

Though official regulations governing the insider trading in India were enforced late compared to other developed countries, the first concrete attempt to regulate insider trading came through in the form of Section 307 and 308 in Companies Act, 1956 of India. The provisions were put in action after recommendation of Thomas Committee in 1948. Subsequently, Sachar Committee and Patel Committee were formed in 1978 and 1986, respectively, to recommend measures to control insider trading in India. Both committees recommended establishment of separate regulations to control insider trading in India. Abid Hussain Committee, in 1989, recommended a ban on insider trading as well as penalty for the same, in the form of civil and criminal proceedings. One of main recommendations was to formulate separate statue for

prevention of insider trading. Based on the recommendations provided by these committees, SEBI formulated and brought in to force a new regulation, "SEBI (Insider Trading) Regulations, 1992". Due to several loopholes and difficulties encountered in the initial years, SEBI subsequently made several amendments and the regulation was renamed as "SEBI (Prohibition of Insider Trading) Regulations, 1992".

The main provisions related to insider trading in India are stipulated in Section 2, 3 and 4 of the regulation. Section 4 stipulates that any insider who deals in securities in contravention of the section 3/3A are guilty of insider trading. Section 3/3A states specifically that no insider can deal, on its own or on behalf of other person, in listed securities of company when such insider possesses unpublished price sensitive information. It also prohibits insiders to communicate or procure unpublished price sensitive information to any personal who while in possession of such information cannot deal in the securities. Section 3A puts similar restrictions on companies. Section 2 provides clarity on insiders and define insiders as any person who is or was (deemed to have been) connected with the company and who is reasonably expected to have (have received or has had) access to the unpublished price sensitive information. The law gives example of corporate insiders that include director, deemed to be director, officer or an employee with access to unpublished price sensitive information, members of board of directors, banker of a company, directors having more than 10% of the holdings, or relatives of connected person. Section 2 further specifies unpublished price sensitive information as any information about company generally not known or published, but if published can materially affect the price of the securities, such as financial results, dividend declarations, issue or buy-back of securities, new projects, expansion, mergers or takeovers, disposal or significant changes in company policies. Anyone found guilty of insider trading can be penalized up to Indian Rupees 250 million or 3 times the amount of profit made. Unlike recommendations proposed by several committees, the regulation do not include any criminal proceedings for insiders guilty of insider dealing.

Due to difficulty involved in identifying illegal insider trading, the regulation has a provision of Policy on Disclosures as well as Code of Corporate Disclosure Practices for Prevention of Insider Trading. The provision consist of continuous, immediate and prompt disclosure of price sensitive information to stock

exchanges, oversee and coordinate the disclosure, responding to market rumours, timely reporting of ownership and shareholding changes, disclosure of price sensitive information with special reference to analysts or institutional investors, medium of disclosure and dissemination by stock exchanges. Any person holding more than 5% of the shares or the voting rights or a change in shareholding or voting rights that exceeds 2% in a listed company is required to disclose it to the company/SEBI within four working days. Likewise, all the directors and officers of a listed company is required to furnish the number of shares held and position taken in derivatives within two days of becoming officer/director. If there is substantial change in the holdings (such as a change exceeding Indian Rupees 0.5 million or 25000 shares or 1% of the holding or voting rights) need to disseminate the information within four working days. Corporations are also required to disclose any price sensitive information to stock exchanges within two days of receipt of such information.

3.3 Review of literature and hypothesis development

3.3.1 Mimicking behaviour of FIIs

The "information content" of insiders' trading literature contends that insiders' trading conveys new information to the market. This strand of literature generally concurs that stocks purchased by insiders earn positive abnormal returns but stocks sold by insiders either do not exhibit the same level of negative abnormal returns or do not earn abnormal returns at all (Lakonishok and Lee, 2001; Friederich et al., 2002; Jeng et al. 2003; Fidrmuc et al., 2006). Lakonishok and Lee (2001) and Jeng, Metrick and Zeckhauser (2003) analyse the longer-horizon abnormal returns (3 to 12 months), and Friederich *et al.* (2002) and Fidrmuc, Goergen and Renneboog (2006) analyse the shorter-horizon abnormal returns (up to 5 to 20 days). This literature argues that share prices may adjust rapidly to the announcement of insiders' trades as stock markets are informationally efficient at least to some extent, hence, longer-horizon returns may not capture the immediate price reaction to such insiders' trades. As a result, our study focusses on the short-term return.

There is a growing literature that disentangles insiders' trading into routine and opportunistic insiders' trading based on the objective of the trading. Studies use

different proxies of opportunistic trading. For example, Rozanov (2008) defines opportunistic insiders' trading as a trade by corporate insiders which are based on non-public information and uses 'PricePattern' to measure the likelihood of insiders' opportunistic trade. 'PricePatterm' is computed as (log of) the ratio of the market-adjusted gross return over 20 trading days following the insider transaction to the market-adjusted gross return over 20 trading days before the insider transaction. The high value of 'PricePattern' indicates increased likelihood of opportunistic insiders' trades. On the other hand, Tirapat and Visaltanachoti (2013) propose a framework to identify an opportunistic insiders' trades based on the measures of information asymmetry and speed of adjustment to market efficiency. Likewise, Kraft et al., (2014) use exclusive trades as a proxy for opportunistic insiders' trades. Exclusive insiders' trades are those trades where only senior officers' trades with no other insiders' trades.

Cohen et al., (2012b) use an ex-ante identification method and define an insiders' trade as routine if the insider places the trade within the same calendar month for at least three preceding years.[55] All other trades are defined as opportunistic trades. They argue that routine sell trades by insiders can be executed for the sake of diversification or liquidity needs, providing signal to the market that insiders are not trading on private information about the firm, whereas routine buys may occur when insiders receive bonus (usually in same month every year) such as discount plans on the firm's stock, hence their trades in the same calendar month are common occurrence and mostly uninformative. In line with their rationale, they find that opportunistic buy (sell) yield higher (lower) abnormal returns relative to routine buy (sell) trades. Therefore opportunistic insiders' buy and sell trades can predict future abnormal return, but routine insiders' buy and sell trades do not contain any private information about the firm and thus cannot predict future abnormal returns (Cohen et al., 2012b; Tirapat and Visaltanachoti, 2013; Kraft et al., 2014). Further, Fidrmuc et al., (2006) argue that insiders, by purchasing shares of their firm, put their own wealth at risk and bear the cost of holding less than optimally diversified portfolio compared to selling the shares of their firm. Hence, they find absolute value of market reaction to directors' sale is smaller than that to directors' purchase. Within the classification of

[55] Khan and Lu (2013), Jia et al., (2014), and Reeb et al., (2014) all follow Cohen et al., (2012b) for the classification of insiders' trading into the routine and the opportunistic insiders' trading.

opportunistic insiders' buy and sell trades, Cohen et al., (2012b) also find absolute return for portfolio based on opportunistic buy trades is higher than absolute return for portfolio return based on opportunistic sell trades.

The evidence that opportunistic insiders' trades are more informative compared to routine insiders' trades is generally based on developed markets. We argue that such analysis could be more important to outsiders in emerging markets for the following two reasons. First, relative to their developed counterpart, emerging capital markets are characterized of being informationally less efficient (Bae et al., 2012; Bekaert and Harvey, 2002), more opaque (Gelos and Wei, 2005), weaker in enforcing corporate governance rules, and are less stringent on the enforcement of securities and insider trading regulations (Allen et al., 2005; Khanna and Palepu, 2000; Khwaja and Mian, 2005). For example, Bhattacharya and Daouk (2002) find that only one out of five emerging markets has insider trading law, and only 25 per cent of emerging markets have had prosecutions related to insider trading. Given the limited coverage of insider trading regulations, the lower likelihood of prosecution and significant market opaqueness, the information content of insider trading could be more valuable in an emerging market.

Second, emerging market firms generally operate in a relatively poor investor protection environment with firms having a concentrated and cross-holding ownership structure, and significant stakes being held by founding families (Bhaumik and Selarka, 2012; Douma et al., 2006; Lins, 2003). For example, Chakrabarti et al. (2008) find that around 60% of the 500 largest Indian companies, which constitute 65% of market capitalization, are held by family-owned groups and 53% of the shareholdings is held by "promoters" or founders. Allen et al. (2004) also suggest that the ownership structure of India is largely similar to other emerging markets. They find that the controlling shareholders are either founders' family or a different family in around 80% of the listed Indian firms (854 firms) and are other corporations in around 15% of the firms. Only around 1.6% of the firms are widely held. They argue that Indian firms have high concentrated ownership due to weak enforcement of regulations and weak institutional framework, though India has strong investor protection by law. These ownership structures would suggest that the insiders are more likely to have access to private information, which could be inferred from their trading behaviour.

Although there is an extensive literature that focuses on the information content of insiders' trades and the excess returns based on the portfolio replicating these trades, there is a paucity of empirical evidence on whether outside investors, including FIIs, actually mimic these trades. Given that opportunistic insiders' trades can predict a superior abnormal return in the emerging market compared to routine insiders' trades, it can be expected that outside investors should mimic the trade of opportunistic insiders' transaction. For example, Cohen et al. (2012b) suggest that institutional investors are aware of these informed insiders' trading and follow past opportunistic insiders' trades. However, Cohen et al. (2012b) do not consider the dynamics between foreign and domestic institutional investors (DIIs). Empirical evidence suggests that there is a differential firm level preference of FIIs and DIIs. Covrig et al., (2006) investigate stock preferences of domestic and foreign fund managers and find that while foreign fund prefer globally visible stocks such as those with high foreign sales, index membership, and foreign listing, domestic fund prefer dividend-paying and growth funds. Chiang et al. (2012) also suggest that foreign investors prefer large-cap stocks with high dividends, and domestic institutions tend to buy small-cap, low-leveraged stocks. Arora (2016) examines the Indian market and find that the trading pattern of FIIs and DIIs is also opposite to each other. For instance, while FIIs act as a feedback trader and influenced by the recent stock returns, DIIs act as a contrarian trader and sell when price increases.[56] These evidences suggest that it is imperative to appreciate the dynamics between FIIs and DIIs trading behavior and study them in isolation. In this study, we specifically examine mimicking by FIIs.

We base our mimicking hypothesis on the following arguments. First, the potential information disadvantage that FIIs suffer, relative to domestic investors, suggests that they are trend followers or momentum traders. Since FIIs do not have access to private information, past returns may contain signals about the private information of informed investors (Wang, 1993), such as those of opportunistic insiders. We argue that superior abnormal returns generated from the trading of opportunistic insiders are thus an important source of information for FIIs. Second, it is well established that FIIs exhibit herding behavior (Froot et al., 2001; Kim and Wei,

[56] However, it has not been empirically examined whether FIIs and DIIs trading influence each other.

2002).[57] We argue that FIIs may trade in the same direction if they are aware of these opportunistic insiders' trading.[58] Third, as long as FIIs find it cost-effective to take a long (short) position, they will trade more following superior abnormal returns earned immediately after the opportunistic insiders' trade. Consequently, if the stock return is driven by the opportunistic insiders' trades, we would expect FIIs' trading to be positive (negative) following opportunistic insiders' buy (sell) trades.[59]

Therefore, we propose hypothesis 1 in the second empirical investigation as:

H_1 (a): FIIs trade in the same direction as past opportunistic insiders' buy trades.

H_1 (b): FIIs trade in the same direction as past opportunistic insiders' sell trades.

3.3.2 FIIs and CARs based on insider trading

The empirical literature examining whether outside investors earn a superior abnormal return by mimicking insiders' trades offers inconsistent results. Earlier evidence by Seyhun (1986) and Rozeff and Zaman (1988) suggests that outsiders do not earn superior returns by imitating insiders' trades. However, Bettis et al. (1997) suggest that outside investors can earn a profit, net of transaction costs, using publicly available insiders' trading information about large trades conducted by top executives. These large trades by top executives could be driven by opportunities to exploit private information, rather than their liquidity needs, as a market reaction to large insider trades is much larger compared to small insider trades (Fidrmuc et al., 2006). Cohen et al. (2012b) find that the portfolio strategy that solely focuses on the trades made by opportunistic traders earns large and significant returns, but the portfolio strategy that focuses solely on the routine trades does not. Similarly, Tirapat and Visaltanachoti

[57] The herding behaviour could be in response to fads or sentiments, or new information in the market.

[58] The [Prohibition of] Insider Trading Regulation, 1992, Section (13) requires shareholders, who hold more than 5% shares or voting rights, and insiders disclose the sales and acquisition of shares to the company within two working days (it was four working days prior to 19/11/2008). Following the receipt of the disclosure, the company is required to intimate the same to the exchanges within two working days (it was five working days prior to 19/11/2008). After that the stock exchanges publishes the information instantly.

[59] It should be noted that any outside investors who analyse the insiders' trading can mimic the insiders' trades. However, we only focus on FIIs due to the reasons noted in the main text.

(2013) report a significant positive return for a portfolio that follows opportunistic insider buys compared to the market return.

Thus, if opportunistic insiders' trades provide a superior market reaction and if FIIs trade in the same direction as the past opportunistic insiders' transaction, we should expect a better return for FIIs for a long strategy on shares bought by opportunistic insiders and for a short strategy on shares sold by opportunistic insiders.

This is examined in the second empirical investigation as hypothesis 2:

H_2: FIIs earn a superior abnormal return on long (short) strategy on stocks bought (sold) by opportunistic insiders.

3.4 Data, variable construction, and summary statistics

3.4.1 Data

Our database is drawn from several sources. We collect insiders' trading data from the Bombay Stock Exchange (BSE) which is publicly available.[60] This database provides information on the firm identification (name and security code), acquirer name, the mode of trade (open market transactions, ESOP and gifts etc.), the quantity of trade, side of the trade (buy or sell), traded date, and reported date. Although the database reports the trading data from 1990 onwards, almost 99.99% of transactions are conducted after 2004. Therefore, we do not consider trading data prior to 2004. We limit our analysis to the end of 2014 for two reasons. First, on 15th January 2015, the Securities Exchange Board of India (SEBI) introduced a new "Prohibition of Insider Trading Regulations 2015" repealing previous regulation established in 1992.[61] Second, FIIs' equity trading was significantly affected by a proposed change in their income in April 2015. It was reported that following the additional tax demand from

[60] http://www.bseindia.com/corporates/Insider_Trading.aspx

[61] The new regulation significantly widened its definition of insiders, the scope of applicability, widened the restrictions on insiders with possession of unpublished price sensitive information, formulated the trading plan approved by the compliance officer, and broadened the monitoring obligations of the firm.

FIIs by the Indian government, FIIs immediately withdrew from the market.[62] These two events could potentially affect the trading behavior of both insiders and FIIs. Since the classification of insiders' trading requires the historical trading data by individual insiders for at least three years, our partitionable universe of insiders' trading ranges from 2007 to 2014. Since, the study uses granular daily trading level data, the sample period is enough to produce robust results.

We apply several well-established and standard filters to clean the data. First, following the insider trading literature, we only focus on open market transactions excluding options exercises and private transactions (Cohen et al., 2012b; Sias and Whidbee, 2010). Second, the SEBI requires every listed firm and director to disclose their interest or holdings as an initial disclosure under regulation 13(1) and 13(2) of the Prohibition of Insider Trading Regulations 1992. Since the disclosure is not an outcome of the open market transaction, we exclude them from our analysis. Third, we exclude any observations with a difference of more than 30 days between the reported date and the actual transaction date. 75% of insiders' trading transactions are reported within five working days, 90% within 15 days and 95% within 30 days. Finally, we also check our insider trading data for consistency. The database lacks consistency with respect to the names of insiders. As a result, for each firm, we ensure that the names of the inside traders are consistent throughout the sample.[63]

We collect the trading level data of FIIs from the SEBI endorsed National Securities Depository Limited (NSDL).[64] This database contains details of all the trading conducted by FIIs since 1st January 2003. It includes each FIIs' identification, scrip name, international security identification number, transaction date, transaction type (buy or sell), stock exchange traded, traded rate, quantity, value, and instrument

[62] "100 FIIs get tax notices for $6bn, say it's retrospective", *The Economic Times*, April 6, 2015; "India on collision course with investor over $6.4 billion tax target", *Financial Times*, April 15, 2015; "How to end India's Tax Terrorism", Bloomberg, April 17, 2015 and, "SEBI backs foreign portfolio investors, raises concern over impact of MAT", *The Economic Times*, May 29, 2015.

[63] We ensure the names of the insiders are consistent for each firm. For example, the name of an insider could be entered as Mr. Harish Shetty or Harish Shetty or Harish Shety for a certain firm. We ensure that the name is consistent (such as Harish Shetty) for the firm throughout the insider universe. The exercise results in 14,003 unique insiders compared to 18,445 unique insiders before the correction.

[64] https://www.FII.nsdl.co.in/web/StaticReports/FIITradeWise2008/FIITradeWise2008.htm

types. Since the sample period of our study ranges from 2007 to 2014, we only include the transaction data of FIIs during this sample period. 99.98% of all transactions are conducted on the BSE and National Stock Exchange (NSE), and 99.36% of all traded securities are equities. Our analysis is based on the purchase and sale of equities on the NSE and the BSE covering 99.34% of all transactions.

The third set of data we collect is firm-level characteristics from the Prowess database, maintained by the Centre for Monitoring Indian Economy (CMIE). We use the MSCI India Index return as a proxy for the market return which we source from Thomson Reuters' database.

3.4.2 Main variable definition and construction

Our principal variables of interest are opportunistic and routine insiders' trading as the independent variables, and FIIs' net equity trading as the main dependent variable. We follow Cohen et al. (2012b) as our main classification strategy to classify an insiders' trade as either routine or opportunistic. For the classification, first, an insider must make at least one trade in each of three preceding years. A routine trader is an insider who places a trade in the same calendar month for at least three consecutive years. Otherwise, the trader is considered as an opportunistic insider. As noted earlier, routine trades are executed for variety of reasons. These trades are often driven by liquidity or diversification needs and such insiders also want to ensure other investors know that (s)he is not trading on any price sensitive information. They may also occur when an insider receives bonuses, and as they receive discount plans, they are more likely to buy more in the same calendar months (Cohen et al., 2012b).

We thus classify an insider as either a routine or opportunistic trader at the beginning of each calendar year. All the subsequent trades that are made, after we have classified each insider as either routine or opportunistic, are then classified as (a) "opportunistic trades (*OT*)" and (b) "routine trades (*RT*)". Once classified, we calculate the *OT* and *RT,* as shown in Equation (3-1) and (3-2), we calculate the *OT* and *RT* as the ratio of number of shares purchased minus number of shares sold by opportunistic (routine) insider *j(k)* on day *t* of the firm *i* scaled by the previous day's number of shares outstanding of firm *i* (Sias and Whidbee, 2010)*:*

$$OT_{j,i,t} = \frac{Number\ of\ shares\ bought_{j,i,t} - Number\ of\ shares\ sold_{j,i,t}}{Number\ of\ shares\ outstanding_{i,t-1}} \quad (3\text{-}1)$$

$$RT_{k,i,t} = \frac{Number\ of\ shares\ bought_{k,i,t} - Number\ of\ shares\ sold_{k,i,t}}{Number\ of\ shares\ outstanding_{i,t-1}} \quad (3\text{-}2)$$

$Opputnistic\ Trading$ ($OT_{j,i,t}$) is further classified into $Opportunistic\ Buy_{j,i,t}$ for a positive value and $Opportunistic\ Sell_{j,i,t}$ for a negative value, followed by a similar classification for $Routine\ Trading_{k,i,t}$ ($RT_{k,i,t}$). As a result of the classification each insider's trades are placed into one of four groups: (a) "Opportunistic buy", (b) "Opportunistic sell", (c) "Routine buy", and (d) "Routine sell".

It should be noted that this simple approach of classifying insiders into routine or opportunistic is clearly a noisy proxy for actual trading strategy. The strategy also may not work perfectly for countries like India, where relaxed insider trading regulations and concentrated ownership structure encourages insiders to trade based on private information. But the simplicity of this approach is also advantageous as the insiders are classified ex-ante. However, as a robustness tests, we use several variations of Cohen et al. (2012b) classification. Most importantly, we also use Ali and Hirshleifer (2017) classification of opportunistic insiders' trade and we report similar results.

Second, we define FIIs' Net Equity Trading (NET_{it}) as the ratio of the number of shares purchased minus the number of shares sold by FIIs in day *t* of firm *i* scaled by the previous day's number of shares outstanding of firm *i*:

$$NET_{it} = \frac{Number\ of\ shares\ bought_{i,t} - Number\ of\ shares\ sold_{i,t}}{Number\ of\ shares\ outstanding_{i,t-1}} \quad (3\text{-}3)$$

3.4.3 Summary statistics

Table 3-1 presents the summary statistics for our sample. The table presents the overview of the entire universe of insiders' trading data as well as the partitionable universe of insiders' trading data for which we can define and classify the "routine" and "opportunistic" trades. Panel A of Table 3-1 indicates that after the classification of insiders' trades into routine and opportunistic trades, our final sample represents approximately 28% (18,626/67,261) of the entire sample of insider transactions. Our sample is also representative of the larger universe of all insiders' trades in terms of percentage of insider buy (79% in our sample and 74% in the entire sample) and percentage of insider sell (21% in our sample and 26% in the entire sample). We classify 82% of insiders' buy and 75% of insiders' sell as opportunistic trades, and 18% of insiders' buy and 25% of insiders' sell as routine trades. Overall, trades made by opportunistic traders comprise 80% and trades made by routine traders comprise 20% of our final sample. Buy and sell trade size of the final sample is smaller than the insider universe and this suggests that the classification of insiders' trading is not size dependent.

Panel B of Table 3-1 shows that the number of unique companies in our final sample (885) represents around 35% of the entire universe sample (2,542), which is similar to the figures reported by Cohen et al. (2012b) for their developed market sample. The figures in the table demonstrate that our partitionable sample firms are larger, in terms of their assets size and market capitalization, and have higher stock returns compared to the insider universe. However, other firm characteristics such as stock volatility, book-market ratios, return on equity, cash holdings, current ratio, firm age, board size and board independence are generally representative of the insider universe.

Table 3-1: Summary Statistics

This table presents an overview of the sample for partitionable universe compared to the entire insider universe over the period 2007-2014. Each year, the partitionable universe is that universe of insiders who have at least one trade in each of the preceding three years (so that routine traders and opportunistic traders can be defined). We follow Cohen et al. (2012b) to classify insiders' trades into opportunistic and routine insiders' trades. For the classification, an insider must make at least one trade in each of three preceding years. A routine trader is an insider who placed a trade in the same calendar month for at least three consecutive years. Otherwise, the trader is considered as an opportunistic. An insider will be classified as either routine or opportunistic at the beginning of each year and all subsequent trades after the classification are then classified as either routine buy (sell) or opportunistic buy (sell) trades. Panel A presents the insider-level characteristics whereas Panel B provides firm-level characteristics. All numbers are full sample averages (medians), except for #, which is the total number over the entire sample period. Stock return is the return on the firm. Stock volatility is the daily standard deviation of stock return calculated using the previous 90 days' stock return. Firm size is defined as the market capitalization of the firm in millions of Indian Rupees (INR). Book-market is the ratio of book value per share to the market price of the firm. Turnover is the percentage of total number of shares traded by the total number of shares outstanding of the firm. Total assets is defined as the value of total assets of the firm in millions of INR. Leverage is defined as the ratio of total debt to shareholders' equity capital of the firm. Return on equity is the annualized return on shareholders' equity capital of the firm. Cash Holdings is defined as the total cash and cash equivalents of funds scaled by the total assets of the firm. Current ratio is defined as the ratio of current assets to current liabilities of the firm. Firm age is the difference between the current year and the year of establishment of the firm. Board size is the number of the members on the board of the firm and Board independence is the percentage of independent directors on the board of the firm.

Panel A: Insider-level characteristics

	Partitionable universe		**Insider universe**	
	Mean	**Median**	**Mean**	**Median**
# of insiders' trades	18,626		67,261	
# of insider buys	14,824		46,230	
% of insider buys that are opportunistic	81.75%			
% of insider buys that are routine	18.25%			
# of insider sells	3,802		21,031	
% of insider sells that are opportunistic	75.04%			
% of insider sells that are routine	24.96%			
% of all trades that are opportunistic	79.59%			
% of all trades that are routine	20.41%			
Buy trade size (bps)	11.47	3.71	23.44	4.30
Opportunistic buy trade size (bps)	12.10	3.95		
Routine buy trade size (bps)	8.51	2.66		
Sell trade size (bps)	-18.97	-0.24	-49.26	-3.61
Opportunistic sell trade size (bps)	-25.10	-5.47		
Routine sell trade size (bps)	-6.63	-0.55		

	Frequency				
# of unique companies		885		2,542	
Stock return (%)	Daily	0.08	0.00	0.02	-0.06
Stock volatility	Daily	3.29	3.21	3.50	3.48
Firm size (INR Million)	Daily	36,809.11	1853.48	23,533.10	869.19
Book-market (Times)	Daily	3.50	0.79	3.34	0.84
Turnover (%)	Daily	0.28%	0.80%	0.50%	0.11%
Total assets (INR Million)	Quarterly	272,456.50	9,323.50	60,105.58	4,751.70
Leverage (%)	Quarterly	99.39%	48.30%	173.92%	56.74%
Return on equity (%), annualized	Quarterly	7.46%	5.83%	8.57%	5.91%

Table 3-1: Continued

Panel B: Firm-level characteristics	**Frequency**				
Cash holdings (%)	Quarterly	5.66%	2.53%	6.42%	2.78%
Current ratio (Times)	Quarterly	4.35	1.37	5.76	1.28
Firm age (Years)	Quarterly	30.63	25	28.79	23
Board size (#)	Quarterly	10.31	10	9.79	9
Board independence (%)	Quarterly	48.49%	50.00%	47.76%	46.67%

3.5 Empirical analysis

3.5.1 Information content of opportunistic and routine insiders' trades

In this section, we provide evidence of the information content of corporate insiders in India. To evaluate the informativeness, we analyse the stock market performance of opportunistic and routine insiders' trades. We perform a multivariate analysis where the main dependent variable is future one-month stock return and the main independent variables are indicators of routine and opportunistic insiders' trades. We run pooled regression with standard errors clustered at the firm level and include time (month) fixed effects.

Our main variables of interest are D(Opportunistic buy), D(Opportunistic sell), D(Routine buy) and D(Routine sell). D(Opportunistic buy) is a binary variable that takes the value of 1 if there were any opportunistic buys on a given firm in the prior month and 0 otherwise. Similarly, D(Routine buy) is a binary variable that takes the value of 1 if there were any routine buys on a given firm in the prior month and 0 otherwise. The definitions of D(Opportunistic sell) and D(Routine sell) are identical. The control variables used in these regressions are similar to those of (Cohen et al., 2012b) and include firm size, book-to-market ratio, past month returns and past year returns. *Firm size* is measured as a log of month-end market capitalization of a given firm. *Book-market* is log of the ratio of the book price to the market price at the end of the month of a given firm. *Past month return* is the return of a given firm over the prior month and *Past year return* is the return of a given firm over the prior year (excluding the prior month, (*t*-2, *t*-12)). The results are presented in Table 3-2. We include D(Opportunistic buy) and D(Routine buy) in Model 1, D(Opportunistic sell) and D(Routine sell) in Model 2, and all the categories of insiders' trade in Model 3. The output in Table 3-2 shows that opportunistic buy trades are significantly positively related to future stock returns, but there is no significant relation to routine buys. Model

1 shows that opportunistic insiders' buy trades are followed by a statistically significant return of 195 basis points in the next month and that routine insiders' buy trades are not followed by a statistically significant return.

Table 3-2: Information content of insiders' trades

This reports the pooled regression of returns on the indicator of opportunistic and routine insiders' trade in the prior month, over the 2007-2014 sample period. The dependent variable is the one-month future stock return. D(Opportunistic buy) is a binary variable that takes the value of 1 if there were any buys on a given firm in the prior month by an opportunistic insider. D(Routine buy), D(Opportunistic sell), and D(Routine sell) are defined similarly. Firm size and Book-market are the natural log of the market capitalization and book-to-market ratio at the prior month end. Past month (year) return is the return of the given firm over the prior month (year, excluding the prior month (*t*-2, *t*-12)). We control for time (month). Standard errors are corrected for clustering at the firm level. *t*-statistics are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Future One Month Stock Return		
	Model 1	Model 2	Model 3
D(Opportunistic buy)	1.9512***		1.6013***
	(3.73)		(3.44)
D(Routine buy)	0.5473		0.4746
	(0.82)		(0.72)
D(Opportunistic sell)		-1.0926	-0.9913
		(3.62)	(3.43)
D(Routine sell)		0.3753	0.3088
		(1.00)	(0.94)
Firm size	-0.8338***	-0.8503***	-0.8645***
	(-25.84)	(-26.07)	(-26.09)
Book-market	0.3745***	0.3620***	0.3891***
	(18.59)	(18.61)	(18.65)
Past month return	0.0481***	0.0480***	0.0481***
	(9.52)	(9.48)	(9.51)
Past year return	0.0014	0.0013	0.0014
	(0.96)	(0.94)	(0.97)
Time (month) fixed effects	Yes	Yes	Yes
Adjusted R^2	0.0707	0.0707	0.708
Number of firms	880	880	880
Number of observations	85,896	85,896	85,896

Model 2 shows that opportunistic and routine insiders' sell trades do not significantly predict the subsequent stock returns. In Model 3, we find that opportunistic insiders' buy trades yield an incremental 160 basis points, which is statistically significant at 1%, in the following month relative to all insiders' trades. Cohen et al. (2012b) and Ali and Hirshleifer (2017) report opportunistic insiders' buy

trades yield an incremental return of 57 basis points and 51 basis points respectively in the US market.

Overall, the combined differences in the coefficients between opportunistic trades and routine trades translate into an incremental return of 243 basis points per month [= (113-47)-((-99)-31)] (compared to only 158 basis points per month reported by Cohen, Malloy, and Pomorski (2012)). As noted in the table, we do not find significant results for the opportunistic and routine sells. Cohen et al. (2012b) , in their regression test, do find that the opportunistic insiders' sell trades have predictive ability in the US; however, they do not find a significant predictive power in their portfolio tests. Ali and Hirshleifer (2017), in their regression tests, also do not find evidence that opportunistic sells predict subsequent returns.[65] Our result on the information content is consistent with the portfolio return evidence provided by Cohen et al. (2012b) and Ali and Hirshleifer (2017); however, and as expected, the incremental return of opportunistic buy traders is much higher and hence, more informative.

The direction and significance of control variables are similar to Cohen et al. (2012b), except for the past month returns. Although Cohen et al. (2012b) report a negative relation between past month returns and future stock returns, we find a positive and significant relation, suggesting the presence of momentum in returns in emerging markets (Rouwenhorst, 1999).

We also analyse the information content using the alternative measure of opportunistic insiders developed by Ali and Hirshleifer (2017). A brief discussion of the identification strategy and the results for information content are reported in Appendix 3-3. This result is similar to our main result reported in Table 3-2. In Appendix 3-4, we present the cumulative abnormal returns (CARs) by using the market model for a period of 41 days centred on the reported day of opportunistic and routine insiders' trades. The results show that the CARs associated with opportunistic insiders' buy trades are higher than routine insiders' buy trades. Similarly, we find that

[65] The literature on insider trading generally concurs that stocks purchased by insiders earn positive abnormal returns, but stocks sold by insiders either do not exhibit the same level of negative abnormal returns or do not earn abnormal returns at all (Fidrmuc et al., 2006; Friederich et al., 2002; Jeng et al., 2003; Lakonishok and Lee, 2001).

the negative CARs for opportunistic insiders' sell transaction is generally lower than routine insiders' sell transaction.

3.5.2 Mimicking Hypothesis

3.5.2.1 Multivariate results

Our findings on the informational content of opportunistic insiders' trades (also see Appendices 3-2 and 3-3) raise an important question of whether outside investors in the emerging markets are aware of this type of informed trading. Cohen et al. (2012b) suggest that institutional investors react more strongly to past opportunistic trades (buy and sell) than to past routine trades (buy and sell). To investigate the link, they regress the change in institutional ownership of a stock on the log of the number of opportunistic and routine trades in that stock in the past two quarters. This approach has a few data limitations. First, change in institutional holdings in a quarter does not consider the buy and sell trades conducted by institutional investors within a quarter that may result in the same (similar) level of institutional holdings at the end of the quarter. Second, the number of opportunistic and routine insiders' trades in a past quarter do not consider the intensity of insiders' trading. A single large opportunistic trade may have a significant impact on the institutional trading. Third, they are not able to observe the immediate reaction by institutional investors to the opportunistic insiders' trading as they examine the quarterly changes.

We explore the connection between FIIs and opportunistic insiders' trading using daily trade-level data. To examine the potential connection between FIIs' equity trading and opportunistic insiders' trading, we follow the trades conducted by FIIs up to 15, 20 and 30 days immediately following the opportunistic insiders' trade. More specifically, we regress the NET_{it} of FIIs on the past opportunistic trades and past routine trades using a multivariate regression analysis.

We also control for various competing factors that could affect the FIIs' trading. Empirical evidence suggests that there is a positive link between net foreign flows and lagged stock returns. Brennan and Cao (1997) suggest that the purchase of foreign assets is high when the return on such assets is high. We control for this effect at the firm level by controlling the previous day's return on individual stocks that FIIs trade on a particular day. Data from the Prowess database provides total stock returns,

including dividend and capital gains for our sample. We denote this as *Stock return* in our analysis. Kang and Stulz (1997) and Dahlquist and Robertsson (2001) argue that foreign investors prefer growth stock, large firms and firms with higher liquidity. Therefore, we control for *Firm size*, measured as log of market capitalization, *Book-market,* measured as log of the ratio book value per share to market price, and *Turnover,* measured as ratio of number of shares traded to total shares outstanding. Further, empirical evidence suggests that the riskiness of the stocks, such as the volatility of returns, also influences the decision of foreign investors to invest in that market (Bae et al., 2004; Li et al., 2011). As a proxy of stock riskiness, we include the daily standard deviation of stock returns calculated using the previous 90 days' stock return of each firm. We label it as *Stock volatility* in our model. We report the correlation matrix of the control variables in Appendix 3-1 and we do not find evidence of multicollinearity. We also calculate the Variance Inflation Factor (VIF) for the models and find VIF value range from 1.00 to 2.05 suggesting that the models are not subject to severe multicollinearity.

Table 3-3 presents the regression results with the control variables for three different periods. We develop our own empirical model where we regress FII's NET_{it} with routine and opportunistic insiders' trading. In Models 1, 2, and 3, we follow FIIs' NET_{it} for 15 days, 20 days and 30 days respectively after the reporting of insiders' trading. In Models 4-6, we rerun our analysis for large insiders' trades only. We use firm fixed effects and time fixed effects to account for firm-level heterogeneity and the time variation respectively. We also double cluster our standard errors at the firm and time levels.

The signs of the regression coefficients and their statistical significance in models 1-3 show that FIIs mimic opportunistic insiders' buy trades, consistent with mimicking hypothesis 1(a). More importantly, we find that FIIs appear to react more strongly to past opportunistic buys relative to past routine buys. The predictive power of past opportunistic buy trades for future FIIs' NET_{it} is positive (coefficient ranges from 0.0025 to 0.0041 with *t*-statistics from 2.25 to 4.08) while the reactions to routine buys are statistically insignificant. Our results strongly indicate that FIIs appear to react quickly as they mimic the opportunistic buy transactions within 15 days of

reporting. Similarly, the reaction persists as we find stronger evidence for longer window periods (20 days and 30 days).

Table 3-3: Mimicking hypothesis

This table shows the results of regressions between Net Equity Trading (NET_{it}) by FIIs after the disclosure of insiders' trades for different periods (15, 20 and 30 days after the disclosure of insiders' trading) and the opportunistic and routine trades over the sample period 2007-2014. NET_{it} is defined as the number of shares traded by all FIIs scaled by previous day's number of shares outstanding of firm *i* in day *t*. The main independent variables are Opportunistic buy, Routine buy, Opportunistic sell, and Routine sell. Opportunistic buy (sell) is the number of shares bought (sold) by opportunistic insiders scaled by previous day's number of shares outstanding of the firm on the reported date. Routine buy (sell) is the number of shares bought (sold) by routine insiders scaled by previous day's number of shares outstanding of the firm on the reported date. The control variables are defined in the notes to Table 3-1. We sort the entire sample trades for each category of insider's trades into terciles and designate the top 33rd percentile as the large insiders' trades. We control for time and firm fixed effects. Standard errors are corrected for clustering at the firm and time levels. *t*-statistics are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

				Large insiders' trades		
	Model 1 (1-15)	**Model 2 (1-20)**	**Model 3 (1-30)**	**Model 4 (1-15)**	**Model 5 (1-20)**	**Model 6 (1-30)**
Opportunistic buy	0.0025**	0.0031***	0.0041***	0.0035**	0.0049**	0.0064***
	(2.25)	(3.56)	(4.08)	(2.46)	(2.43)	(3.19)
Routine buy	-0.0000	0.0013	0.0006	-0.0031	0.0018	0.0021
	(-0.01)	(0.48)	(0.19)	(-1.25)	(0.77)	(0.89)
Opportunistic sell	-0.0051	-0.0036	-0.0024	0.0010	0.0013	0.0017
	(-0.77)	(-0.67)	(-0.47)	(0.90)	(1.11)	(1.57)
Routine sell	-0.0010	-0.0016	-0.0012	-0.0005	-0.0018	-0.0011
	(-0.62)	(-0.82)	(-0.83)	(-0.29)	(-0.78)	(-0.63)
Stock return	0.2752***	0.2755***	0.2697***	0.3864***	0.2947***	0.2669***
	(3.66)	(3.68)	(3.97)	(3.86)	(2.91)	(3.39)
Firm size	0.0045	0.0042	0.0036	0.0157*	0.0091	0.0078
	(0.76)	(0.65)	(0.59)	(1.72)	(1.08)	(1.09)
Book-market	-0.0197**	-0.0191**	-0.0166**	-0.0228**	-0.0203**	-0.0197**
	(-2.16)	(-2.18)	(-2.11)	(-2.20)	(-2.12)	(-2.17)
Turnover	0.3750	1.5157*	1.9591**	0.1881**	1.4157**	1.7162**
	(0.31)	(1.65)	(2.06)	(2.05)	(2.29)	(2.08)
Stock volatility	-0.2850	-0.1324	-0.1847	-0.1909	-0.1503	-0.2577
	(-0.99)	(-0.46)	(-0.61)	(-0.44)	(-0.35)	(-0.57)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.1443	0.1191	0.1081	0.1491	0.1323	0.1056
Number of firms	438	453	467	350	360	375
# of observations	60,498	78,249	119,323	15,970	20,608	31,533

However, we find that the reactions to past opportunistic insiders' sell transactions are different. The predictive power of past opportunistic sell trades is not statistically significant, rejecting hypothesis 1(b), which suggests that FIIs do not trade in the same direction as past opportunistic insiders' sell. The reason for this pattern may be that markets attach less informational content to sales because some of the sales may be made due to insider's needs rather than bad news. Fidrmuc et al. (2006) argue that insiders, by purchasing shares of their firm, put their own wealth at risk and

bear the cost of holding less than optimally diversified portfolio compared to selling the shares of their firm. Hence, they find absolute value of market reaction to directors' sale is smaller than that to directors' purchase. Cohen et al. (2012b) also find absolute return for portfolio based on opportunistic buy trades is higher than absolute return for portfolio return based on opportunistic sell trades. Our examination of CARs for opportunistic buy and sell trades in Appendix also show that the absolute return of opportunistic buy is larger than opportunistic sell. The lower information content of opportunistic sell may be the reason that we do not find significant reaction by FIIs for opportunistic insiders' sell trades.

In Models 4-6, we examine the opportunistic and routine insiders' trades made by large insiders. Here, we sort the entire sample for each category of insider's trades into terciles and designate the top 33rd percentile as the large insiders' trades. Large trades could be driven by opportunities to exploit private information, as the market reaction to large insider trades is greater than small insider trades (Fidrmuc et al., 2006). Further, the size of trading by specific insiders, such as CEOs and Chairmen, who have more "inside" information (Jeng et al., 2003), is larger than that of other insiders, such as executive, non-executive directors, and employees (Fidrmuc et al., 2006; Goergen et al., 2019; Lin and Howe, 1990). Given the larger market reaction and the possibility that the large trades could be executed by better informed insiders, we expect the relation to be stronger. Consistent with our expectation, we find a stronger positive relation between FIIs' NET_{it} and opportunistic insiders' buy trades.

In contrast to Cohen et al. (2012b), who focus on the trading history of each insider to identify the opportunistic and routine trades, Ali and Hirshleifer (2017) focus on the profitability of past insiders' trades prior to the QEA. As a robustness test, we use Ali and Hirshleifer (2017) identification strategy to classify the insiders' opportunistic trades.[66] The results are presented in the Appendix 3-6. Using this alternative definition, we find results consistent with our main result in Table 3-3 supporting the mimicking hypothesis.

It is possible that some of the firms within our sample could have higher levels of corporate governance, hence the FIIs' mimicking behavior could be lower in these

[66] The identification strategy is discussed in the Appendix 3-3.

firms. We conduct a sub-sample analysis on firms that are internationally cross listed at the time of the trading.[67] The results are presented in the Appendix 3-5. As expected, we find an attenuated effect of opportunistic insiders' trading for the internationally cross-listed firms.

Collectively, the findings from these tests highlight a strong positive association between FIIs' NET_{it} and opportunistic insiders' buy trades, supporting the mimicking hypothesis. This suggests that FIIs value the information content of opportunistic buy trades and themselves trade in the same direction. However, the FIIs do not seem to accord the same informational content for opportunistic sell trades as well as routine trades and do not seem to mimic these trades. We do not find any evidence of the predictive ability of opportunistic sell and no significant differences in CARs between opportunistic sell and routine sell trades. This explains the lack of support for the mimicking hypothesis in relation to opportunistic sells.

3.5.2.2 Who mimics insiders' trades?

The evidence that FIIs mimic opportunistic insiders' buy trades raises a question whether there is a differential reaction to the insiders' trades based on FIIs' heterogeneity. Our dataset allows us to track the portfolio holding of FIIs since the beginning of 2003.[68] To identify the characteristics of FIIs, first we calculate the daily portfolio holding of each FII for each firm. Next, we classify each FII as (a) past FIIs, if portfolio holding in a firm in the previous trading day is either zero or negative, (b) new FIIs, if there is no portfolio holding in a firm in the previous trading day, and (c) existing FIIs, if portfolio holding in a firm in the previous trading day is positive.[69]

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[67] A well-established body of literature, known as the bonding hypothesis, offers convincing theoretical arguments and empirical evidence that internationally cross-listed firms, particularly from emerging markets, possess better corporate governance practices relative to their non-cross-listed domestic counterparts, as the former must comply with stringent corporate governance regulations of the developed market (see Stulz, 1999; Coffee, 2002; Karolyi, 2012). We obtain the list of cross-listed firms from https://www.adrbnymellon.com/directory/dr-directory (maintained by The Bank of New York Mellon). We identify 190 Indian firms that are currently listed as well as terminated in the past. After matching, we identify 89 cross-listed firms where both FIIs, and opportunistic and routine insiders trade.

[68] The trading level data by NSDL masks the true identification of FIIs but provides a unique identification code.

[69] Theoretically, the portfolio holdings should be equal to or greater than zero. Since, FIIs' trading level data starts from 2003, we are not able to track portfolio holdings of FIIs prior to 2003. As a result, the portfolio holdings might take a negative value.

Finally, NET_{it} is classified into (a) NET_{it} by past FIIs, (b) NET_{it} by new FIIs, and (c) NET_{it} by existing FIIs. Our final sample includes 2,000 distinct FIIs: 55% are past, 60% are new and 83% are existing FIIs.[70] We rerun the analysis in Table 3-3 (for 30 days) and present the results in Table 3-4.

Table 3-4: Who mimics insiders' trades?

This table shows the results of regressions between Net Equity Trading (NET_{it}) by Past FIIs, New FIIs, and Existing FIIs, 30 days after the disclosure of insiders' trading and the opportunistic and routine trades over the sample period 2007-2014. NET_{it} is defined as the number of shares traded by FIIs (Past, New and Existing) scaled by the previous day's number of shares outstanding of firm *i* in day *t*. We calculate the daily portfolio holding of each FII for each firm. We classify each FII as (a) past FIIs, if portfolio holding in a firm in the previous trading day is either zero or negative, (b) new FIIs, if there is no portfolio holding in a firm in the previous trading day, and (c) existing FIIs, if portfolio holding in a firm in the previous trading day is positive. The main independent variables are Opportunistic buy, Routine buy, Opportunistic sell, and Routine sell. Opportunistic buy (sell) is the number of shares bought (sold) by opportunistic insiders scaled by the previous day's number of shares outstanding of the firm on the reported date. Routine buy (sell) is the number of shares bought (sold) by routine insiders scaled by the previous day's number of shares outstanding of the firm on the reported date. The control variables are defined in the notes to Table 3-1. We control for time and firm fixed effects. Standard errors are corrected for clustering at the firm and time levels. *t*-statistics are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Past FIIs Model 1 (1-30)	New FIIs Model 2 (1-30)	Existing FIIs Model 3 (1-30)
Opportunistic buy	-0.0004	0.0057**	0.0086***
	(-0.17)	(2.52)	(4.05)
Routine buy	0.0046	-0.0002	0.0006
	(1.64)	(-0.04)	(0.15)
Opportunistic sell	-0.0016	0.0045	-0.0017
	(-0.96)	(1.25)	(-0.37)
Routine sell	-0.0003	0.0009	-0.0010
	(-0.38)	(1.42)	(-1.00)
Stock return	0.0758***	0.1700***	0.1885***
	(3.61)	(2.93)	(3.03)
Size	0.0043	0.0044	0.0061
	(1.37)	(0.81)	(-1.16)
Book-market	-0.0038***	-0.0004**	-0.0170**
	(-2.94)	(-2.44)	(-2.54)
Turnover	0.9503**	2.8273**	2.0430**
	(2.21)	(2.19)	(2.22)
Stock volatility	0.3070	0.2578	-0.3277
	(1.06)	(0.49)	(-1.30)
Time fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Adjusted R^2	0.1586	0.4161	0.07330
Number of firms	348	331	426
Number of observations	76,299	26,932	111,882

[70] The same FIIs may be classified as new, past or existing at different times based on their previous day portfolio holdings.

In Models 1, 2, and 3, the dependent variable is NET_{it} by past, new, and existing FIIs respectively. All other variables are similar to Table 3-3. The coefficients of opportunistic buy trades are statistically significant in Models 2 and 3, suggesting that new and existing FIIs mimic the opportunistic insiders' buy trades, but past FIIs do not. The evidence on existing FIIs complements (Schmidt, 2018) who finds that institutional investors remain more attentive to stocks that are already in their "portfolio watchlist". We provide an additional insight that FIIs could also pay attention to information on potential stocks to be included in their portfolio, hence, new FIIs positively react to the opportunistic insiders' buy trades. However, we do not find evidence that FIIs who held a stock in the past react to the information content of opportunistic insider trades.

3.5.2.3 Addressing endogeneity

Based on the evidence in Table 3-3, we attribute the FIIs' trading to the past opportunistic insiders' buy trading. However, the result could be driven by endogeneity between FIIs' and insiders' trading. This endogeneity may arise due to the possibility of reverse causality between FIIs' and insiders' trading. Sias and Whidbee (2010) explore this characteristics hypothesis and suggest that the security characteristics that attract insiders deter the institutional investors. Empirical evidence suggests that insiders prefer value stocks and stocks that have recently declined in value (Jenter, 2005; Piotroski and Roulstone, 2005; Sias and Whidbee, 2010). However, FIIs prefer growth stocks, chase stocks with recent positive returns and avoid high dividend paying firms (Ferreira and Matos, 2008; Gompers and Metrick, 2001). These diverse preferences could suggest an inverse relation between the insiders' and FIIs' equity trading. To test the possibility that lagged FIIs' NET_{it} may explain the present insiders' trading, we conduct two analyses. First, we regress the lag NET_{it} by FIIs before the disclosure of insiders' trading with the opportunistic and routine insiders' trades over our sample period. We also control for other factors that might influence the FIIs NET_{it}, as discussed in the previous section. The results are presented in Table 3-5 (Models 1-3) where we include the time and day fixed effects. The standard errors are clustered at the time and the firm levels.

In Model 1, we regress the 15-day lag FIIs' NET_{it} with the Opportunistic buy, Routine buy, Opportunistic sell and Routine sell. In Model 2, we use 20-day lag FIIs' NET_{it} and in Model 3, we use 30-day lag FIIs' NET_{it}. In all three models, we do not find any statistical significance for our main explanatory variables, eliminating any concerns about the possibility that insiders react to past FIIs' NET_{it} directions.

Table 3-5: Reverse causality

This table shows the results of regressions between Net Equity Trading (NET_{it}) by FIIs before the disclosure of insiders' trades and the opportunistic and routine insiders' trades in Models 1-3 over the sample period 2007-2014. NET_{it} is defined as the number of shares traded by all FIIs scaled by the previous day's number of shares outstanding of firm *i* in day *t*. The main independent variables Opportunistic buy, Routine buy, Opportunistic sell, and Routine sell are defined in the notes to Table 3-3. All the control variables are defined in the notes to Table 3-1. We control for time and firm fixed effects. Standard errors are corrected for clustering at the firm and time levels. *t*-statistics are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Model 1 (-15, -1)	Model 2 (-20, -1)	Model 3 (-30, -1)
Opportunistic buy	-0.0015	-0.0039	-0.0027
	(-0.32)	(-0.97)	(-1.09)
Routine buy	-0.0069	-0.0091	-0.0067
	(-0.84)	(-0.87)	(-0.86)
Routine sell	-0.0024	-0.0017	-0.0019
	(-1.44)	(-1.34)	(-1.54)
Opportunistic sell	-0.0039	-0.0014	-0.0035
	(-0.42)	(-0.17)	(-0.62)
Stock return	0.3502***	0.3473***	0.3256***
	(7.20)	(6.87)	(6.55)
Firm size	0.0046	0.0041	0.0041
	(0.83)	(0.76)	(0.89)
Book-market	-0.0218**	-0.0204**	-0.0212**
	(-2.15)	(-2.14)	(-2.54)
Turnover	1.7790***	1.7521***	1.5000***
	(3.39)	(4.06)	(3.96)
Stock volatility	-0.1015	-0.1772	-0.1615
	(-0.33)	(-0.65)	(-0.62)
Time fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Adjusted R^2	0.1817	0.1668	0.1507
Number of firms	426	440	456
Number of observations	40,108	51,915	78,559

Second, we address the concern of endogeneity by comparing the NET_{it} of FIIs who trade in the same firms where opportunistic and routine insiders trade (the treatment group) with FIIs who trade in similar firms where opportunistic and routine

insiders do not trade (the control group).[71] If FIIs are not reacting to the insiders' trading, then there should not be any difference in the FIIs' trading for these otherwise similar treatment and control firms. As the multivariate analysis provides evidence that FIIs' primarily follow opportunistic insiders' buy trades, here our focus is only on opportunistic trades.

We construct the treatment and control groups using the propensity score matching (PSM) approach. We start by identifying firms where both FIIs, and opportunistic and routine insiders' trade, and firms where FIIs trade but opportunistic and routine insiders do not. Out of 2,192 firms where FIIs trade, we find 722 firms where both FIIs, and opportunistic and routine insiders trade during the sample period and 1,470 firms where only FIIs trade during the sample period.[72] We use the following two steps of the PSM technique to identify matches between these two groups of firms. In the first step we estimate a probit model where the dependent variable is equal to 1 if the firm belongs to the treatment group (i.e. firms in which both FIIs, and opportunistic and routine insiders trade) and 0 otherwise. We use various firm-level characteristics as control/matching characteristics variables, such as firm size, leverage, return on equity, cash holdings, current ratio, firm age, board size and board independence. These variables are included to help satisfy the parallel trend assumptions as there should not be any firm-specific differences in characteristics between treatment and control groups.

Model 1 of Table 3-6 (Panel A) presents the probit model estimates with industry fixed effects and standard errors clustered at the industry level. The specification shows some of the independent variables are statistically significant, suggesting variation in firms' characteristics between the treatment and control groups. We then use the propensity scores from Model 1 to perform nearest-neighbor PSM within a 0.01 caliper. Our sample consists of 462 unique pairs of matched firms.

[71] As shown in Table 3-1, our partitionable universe consists of 885 firms out of 2,542 firms. We identify the matched control firms from the remaining firms.

[72] There are 163 firms where insiders trade but FIIs do not.

Table 3-6: Propensity Score Matching

This table reports the results of PSM. Treatment group is defined as the firms where both insiders and FIIs trade, whereas Control group is defined as the firms where FIIs trade, but insiders do not. We use PSM with nearest neighborhood of 0.01 caliper using various firm level characteristics to identify matched control groups. Panel A presents the parameter estimates from the probit model used to estimate the propensity scores for the treatment and control groups. The dependent variable is 1 if in the treatment group and 0 if in the control group. The firm-level characteristics are defined in the notes to Table 3-1. We control for industry fixed effects. Standard errors are corrected for clustering at the industry level. Panel B reports the distribution of estimated propensity scores post-matching. Panel C reports the univariate comparison between the treatment and control firm's characteristics and their corresponding *t*-statistics are reported in parentheses below the regression coefficients. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

Panel A: Pre-match propensity score regression and post-match diagnostic regression

	Dummy=1 if in treatment group; 0 if in control group	
	Model 1 Pre-match	Model 2 Post-match
Firm size	0.1278***	-0.0344
	(7.64)	(-1.24)
Leverage	0.0005	-0.0025
	(0.56)	(-1.21)
Return on equity	0.2904***	0.0038
	(4.34)	(1.15)
Cash holdings	-0.2882	0.0881
	(-1.17)	(0.24)
Current ratio	-0.0000	0.0006
	(-0.08)	(0.52)
Firm age	-0.1033*	-0.0531
	(-1.66)	(-0.61)
Board size	0.2235**	-0.0024
	(2.26)	(-0.01)
Board independence	0.4110**	-0.0573
	(2.08)	(-0.22)
Industry fixed effects	Yes	Yes
Pseudo R^2	0.05952	0.03128
Number of observations	55,704	29,517

Panel B: Estimated propensity score distributions

	Obs.	Min	P5	P50	Mean	SD	P95	Max
Treatment	462	0.125	0.268	0.503	0.469	0.117	0.632	0.748
Control	462	0.131	0.268	0.505	0.473	0.12	0.642	0.757
Difference	-	-0.006	0.000	-0.002	-0.004	-0.003	-0.01	-0.009

Panel C: Difference in firm characteristics

	Treatment	Control	Difference	*t*-statistics
Firm size	8.136	8.255	-0.118	-1.14
Leverage	1.471	1.692	-0.221	-0.71
Return on equity	0.116	0.115	0.002	0.34
Cash holdings	0.063	0.062	0.001	0.37
Current ratio	3.110	3.589	-0.479	-0.64
Firm age	3.247	3.252	-0.006	-0.44
Board size	2.263	2.273	-0.010	-1.62
Board independence	0.470	0.468	0.001	0.55

We conduct some diagnostic tests to verify our matching process. First, we rerun the probit model on the matched sample of firms and find that none of the independent variables is statistically significant (as shown in Model 2 of Table 3-6 Panel A). This suggests that there are no observable differences in firm characteristics between the treatment and the control groups. Second, we examine the difference between the propensity scores of the treated group and the matched control group. Panel B of Table 3-6 shows that the difference in the propensity scores across the two groups is very small. Finally, we report the univariate statistics of the firms' characteristics of the two groups with their corresponding *t*-statistics in Panel C of Table 3-6. As shown, none of the mean differences in the firms' characteristics between the treatment and the control group firms is significant. Overall, the diagnostic tests show that our approach of using the PSM process removes observable differences between firms where both FIIs and insiders trade and firms where only FIIs trade.

In Table 3-7, we examine the difference in the NET_{it} between the treatment group and its PSM control group.[73] In Panel A, we present the mean difference in the NET_{it} for the opportunistic buy and the opportunistic sell trades. Columns (2) and (3) report the average FIIs' NET_{it} before and after the reported date of opportunistic insiders' buy trades and sell trades for the treatment groups respectively and column (4) reports the difference. Likewise, Columns (5-7) report similar statistics for the control group. In Column (8), we report the DiD estimator, which is the difference in NET_{it} between the control and treatment groups before and after the reported date of opportunistic insiders' buy and sell trades (corresponding *t*-statistics are presented in parentheses).

First, for the treatment group the NET_{it} increases following the reporting of opportunistic insiders' buy trades, whereas the NET_{it} decreases following the reporting of opportunistic insiders' sell trades, which is consistent with the mimicking hypothesis. Second, and most importantly, the increase in the FIIs' NET_{it} after the reporting of opportunistic insiders' buy trades is larger for the treatment group than for the control group, as the DiD estimator is positive and statistically significant at 5% for -15 to 15 days window period and 1% for -20 to 20 days and -30 to 30 days.

[73] For each matched control firm, we assume the event date to be the same as that of the matched treatment firms.

Interestingly, the decrease in the FIIs' NET_{it} after the reporting of opportunistic insiders' sell trades is larger for the treatment group than for the control group and is statistically significant at 5% for the -30 to 30 days window period only. These results are consistent with our main findings that FIIs' generally trade in the same direction when opportunistic insiders buy stocks.

We also show the dynamics of DiD estimator results in a regression framework in Panel B of Table 3-7. We retain the FIIs' trading level data for both treatment and control firms centered on the reporting date for three periods: 15 days, 20 days and 30 days. Our main dependent variable is FIIs' NET_{it}. Our main independent variable is either *Opp buy event*$_t$ × $TRMT_i$ or *Opp sell event*$_t$ × $TRMT_i$. The variable *Opp buy event*$_t$ is the dummy variable which equals 1 for the days after the reporting of opportunistic insiders' buy trades and 0 otherwise. Similarly, *Opp sell event*$_t$ is the dummy variable which equals 1 for the days after the reporting of opportunistic insiders' sell trades and 0 otherwise. $TRMT_i$ is the dummy variable equal to 1 for the firms in the treatment group and 0 for the firms in the control group.

We report the regression results for opportunistic insiders' buy trades in Models 1-3 and for opportunistic insiders' sell trades in Models 4-6. We use the same set of control variables as used in Table 3-3 and defined in the notes to Table 3-1. We control for time and firm fixed effects, and cluster the errors at the time and firm levels. In Models 1-3, we observe statistically significant positive coefficients for our main independent variable and in Models 3-6 we observe insignificant negative coefficients for our main independent variable. The results suggest that, compared to control firms, FIIs buy shares immediately after observing the opportunistic insiders' buy trades, providing support for our main findings that FIIs mimic the opportunistic insiders' buy trades, but do not mimic the opportunistic insiders' sell trades.

Table 3-7: Difference-in-Differences for FIIs Equity Trading

This table reports the DiD test examining how opportunistic insiders' trades affect the Net Equity Trading (NET_{it}) of FIIs. NET_{it} is defined as the number of shares traded by all FIIs scaled by the previous day's number of shares outstanding of firm *i* in day *t* (reported in pbs units). Treatment group is defined as the firms where both insiders and FIIs trade, whereas Control group is defined as the firms where FIIs trade, but insiders do not. We use PSM with nearest neighborhood of 0.01 caliper using various firm level characteristics to identify matched control groups. Panel A provides the DiD test results for NET_{it} before and after the disclosure of opportunistic buy and opportunistic sell trades. Panel B reports the regression estimates of NET_{it} of treatment and control firms surrounding the disclosure of opportunistic and routine insiders' trades. The dependent variable is NET_{it} by FIIs. $Opp\ buy\ event_t$ is a dummy variable that takes the value of 1 after the disclosure of opportunistic insider buy trades and 0 before the disclosure. $Opp\ sell\ event_t$ is a dummy variable that takes the value of 1 after the disclosure of opportunistic insider sell trades and 0 before the disclosure. $TRMT_i$ is dummy variable that takes the value of 1 for treatment firms and 0 for control firms. All the control variables are defined in the notes to Table 3-1. For consistency, the coefficients of control variables are divided by 100. We control for time and firm fixed effects. Standard errors are corrected for clustering at the firm and time levels. *t*-statistics are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

Panel A: Net equity trading difference-in-differences test

	Treatment			Control			Mean DiD estimator
	Opportunistic buy			Opportunistic buy			
Window period (days)	-15 to 0 (1)	1 to 15 (2)	Difference (3) = (2)-(1)	-15 to 0 (4)	1 to 15 (5)	Difference (6) = (5)-(4)	(3)-(6)
-15 to 15	1.6291	2.5921	0.9630***	1.6036	1.9049	-0.3013	1.2643**
			(4.51)			(-0.60)	(2.00)
-20 to 20	1.4635	2.5342	1.0707***	1.4277	1.5349	0.1073	0.9634***
			(5.87)			(0.21)	(2.65)
-30 to 30	1.3110	2.2991	0.9881***	1.3687	1.1650	-0.2127	1.2008***
			(7.23)			(-0.53)	(2.67)
	Opportunistic sell			Opportunistic sell			
-15 to 15	-0.1840	-0.7073	-0.5232***	-0.1767	-0.2335	-0.0568	-0.4664
			(-3.36)			(-0.12)	(-1.01)
-20 to 20	-0.2992	-0.7580	-0.4588***	-0.2270	-0.2240	0.0030	-0.4618
			(-3.50)			(0.00)	(-1.14)
-30 to 30	-0.2509	-0.6954	-0.4445***	-0.2211	0.0648	0.2859	-0.7304**
			(-4.45)			(0.86)	(-2.27)

Table 3-7: Continued

Panel B: Net equity trading difference-in-differences regression analysis

	Opportunistic buy			Opportunistic sell		
	Model 1 (-15,15)	Model 2 (-20,20)	Model 3 (-30,30)	Model 4 (-15,15)	Model 5 (-20,20)	Model 6 (-30,30)
$Opp\ buy\ event_t \times TRMT_i$	0.6805***	0.6600***	0.4823**			
	(2.84)	(2.95)	(2.11)			
$Opp\ sell\ event_t \times TRMT_i$				-0.1595	-0.1132	-0.1715
				(-0.62)	(-0.52)	(-0.81)
Stock return	0.5655***	0.5338***	0.4734***	0.9655***	0.9760***	0.9231***
	(2.73)	(2.94)	(2.70)	(4.66)	(3.93)	(3.35)
Firm size	0.0462**	0.0518**	0.0443*	0.0150**	0.0118*	0.0107**
	(2.17)	(1.97)	(1.96)	(2.37)	(1.95)	(1.98)
Book-market	-0.0502**	-0.0624**	-0.0604**	-0.0714**	-0.0657*	-0.0607*
	(-2.01)	(-2.14)	(-2.02)	(-2.05)	(-1.89)	(-1.70)
Turnover	0.9982**	1.1881**	1.3750**	0.8380*	1.6373*	1.8697*
	(2.08)	(2.44)	(2.66)	(1.83)	(1.95)	(1.90)
Stock volatility	-0.0787	-0.01082	-0.0597	-0.0386	-0.0616	-0.0409
	(-0.49)	(-0.66)	(-0.40)	(-0.06)	(-0.01)	(-0.08)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.096	0.094	0.082	0.093	0.077	0.062
Number of firms	364	380	392	314	325	341
Number of observations	51,847	67,146	102,183	62,754	81,249	123,810

3.5.3 Abnormal return of the insider mimickers

In this section, we test our second hypothesis by examining whether the FIIs who mimic opportunistic insiders' trade have better trading performance. We use both calendar-time portfolio tests and an event study approach. As we are interested in examining only the returns earned by FIIs, our analysis focuses on only those firms where both FIIs and insiders (opportunistic and routine) trade.[74]

3.5.3.1 Calendar-time portfolio analysis

Using a calendar-time portfolio approach, we first examine whether FIIs who mimic opportunistic insiders' trade earn a superior return. We calculate returns based on four portfolios: one for each category of insiders' trade. Specifically, we construct portfolio Opportunistic buy (sell) for stocks that were bought (sold) by opportunistic insiders and Routine buy (sell) for stocks that were bought (sold) by routine insiders. Drawing on the approach of Kallunki et al. (2018), we calculate the following returns measures for each of the portfolios. For each month in our sample period (January 2007 to December 2014, a maximum of 96 months), we calculate the raw return over the one-month period following each insider trade in four categories. We then calculate the monthly averages of these raw returns separately for opportunistic (routine) insiders' sell and purchases. For the abnormal return, we follow the same procedure using a one-month CAR instead of raw returns. This results in a time-series of equally weighted monthly portfolio returns earned when mimicking the four classifications of insiders' trades. Next, we use an intercept test using the CAPM where the dependent variable is the calendar-time returns of each portfolio or difference between returns of long opportunistic (routine) buy and short opportunistic (routine) sell portfolios, or the difference between returns of long opportunistic buy (sell) and long routine buy (sell) portfolios. We examine the following CAPM regression for all four portfolios:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p\left(R_{mt} - R_{ft}\right) + \varepsilon_{pt} \quad (3\text{-}4)$$

[74] It is worth noting that the returns could also be earned by any investors who mimic opportunistic insiders' trading of firms.

where R_{pt} is the portfolio return for month t for each portfolios, R_{ft} is the month t risk free rate of return proxied using 90-day treasury bills rate, $R_{mt} - R_{ft}$ is the month t excess return.

Table 3-8 reports the calendar-time raw returns, average abnormal returns, and risk-adjusted returns for four portfolios mimicking the opportunistic (routine) insiders' trades, the long-short portfolio for opportunistic insiders' buy and sell trades, and long-long portfolio for opportunistic and routine insiders' trades. The results in Panel A show that average raw returns and average CARs of the portfolio based on opportunistic insiders' buy trades are significantly higher than those of the portfolio based on routine insiders' buy trades. The portfolio of opportunistic buy trades yields an average monthly CAR of 2.50% (statistically significant at 1%) that translates into an economically meaningful annualized return of 34.49%, whereas the portfolio of routine buy trades yields a mean monthly CAR of 0.60% (statistically significant at 5%) that is equivalent to an annualized return of 7.44%, a difference of 27.05% between opportunistic and routine buys. These results hold after controlling for risk using the standard CAPM model. The estimated intercept from CAPM is significantly positive for opportunistic buy portfolios (2.19%) and for Long OB-Long OS portfolios (1.12%).

In Panel B of Table 3-8, we find a significant negative mean monthly CAR for opportunistic sell portfolio (at the 1% level). However, the return is not significantly different from the routine sell portfolio. In Panel C, we conduct the long-short portfolio for opportunistic (routine) buy and sell trades and find that the Long OB-Short OS portfolio yields a significantly higher average CAR compared to the Long RB-short RS portfolio.

Taken together, the results support hypothesis 2 and suggest that FIIs earn a significantly higher return when they mimic the opportunistic insiders' buy trades, compared to routine insiders' buy trades, but the return from opportunistic insiders' sell is no different from the routine insiders' sell trades.

Table 3-8: Calendar-time portfolio analysis

This table reports the percentage monthly returns earned on portfolios formed using four different classifications of insiders' trading: Opportunistic buy (OB) and Routine buy (RB) along with Long OB-Long RB portfolio in Panel A, Opportunistic sell (OS)-Routine sell (RS) along with Long OS and Long RS portfolio in Panel B, and Long OB-Short OS and Long RB-Short RS portfolio in Panel C. We calculate the one-month mean raw return and one-month average CARs following each category of insiders' trade for each calendar month between January 2007 and December 2014. Average raw return is the average monthly percentage return earned by each portfolio. Average CARs is the average monthly percentage of CARs earned by each portfolio calculated using the market model as discussed in the notes to Table 3-2. The Intercept is the estimated intercept using CAPM from a time-series regression of the portfolio return ($R_{pt} - R_{ft}$) on the market excess return ($R_{mt} - R_{ft}$). The average monthly number of trades is also reported. Opportunistic buy, Routine buy, Opportunistic sell, and Routine sell are defined in the notes to Table 3-3. *t*-statistics appear in parentheses below the returns and coefficient estimates. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

Portfolio	Average monthly # of trades	Average raw return (%)	Average CARs (%)	Intercept	$R_{mt} - R_{ft}$	R^2
Panel A. No. of months=95						
Opportunistic buy (OB)	19	2.71	2.50***	2.19**	1.10***	0.5473
			(3.24)	(3.29)	(10.43)	
Routine buy (RB)	12	0.71	0.60**	1.07	0.96***	0.3120
			(2.42)	(1.29)	(6.28)	
Long OB – Long RB	31	2.00***	1.90***	1.12***	0.14	0.4140
		(2.96)	(2.80)	(2.96)	(0.73)	
Panel B. No. of months=95						
Opportunistic sell (OS)	16	-0.28	-0.17***	-0.35**	0.76***	0.4075
			(-2.68)	(-2.36)	(7.87)	
Routine sell (RS)	10	0.22	-0.14	-0.11	0.65***	0.3774
			(-0.75)	(-1.25)	(7.22)	
Long OS – Long RS	26	-0.50	-0.03	-0.24	0.11	0.3962
		(-0.80)	(-1.08)	(-0.18)	(0.79)	
Panel C: Long-short portfolio						
Long OB – Short OS	35	2.99***	2.67***	2.54***	0.35***	0.4978
		(2.77)	(2.75)	(3.06)	(2.42)	
Long RB – Short RS	22	0.49	0.74	1.18	0.32*	0.3552
		(1.28)	(1.43)	(1.25)	(1.76)	

3.5.3.2 Cumulative abnormal returns of the treatment and the control firms

In this section, we compare the CARs of the FIIs who trade in the treatment firms with CARs of FIIs who trade on the PSM control firms. We conduct an event study and compare the CARs earned after reporting of opportunistic insiders' buy and sell trades for the treatment and the control group and examine the difference in the CARs.

Table 3-9: Difference in CARs between the treatment and the control firms

This table reports the DiD test examining the difference in abnormal returns between the treated and control groups. Treatment group is defined as the firms where both insiders and FIIs trade, whereas Control group is defined as the firms where FIIs trade, but insiders do not. We use PSM with the nearest neighborhood of 0.01 caliper using various firm-level characteristics to identify matched control groups. The cumulative abnormal returns (CARs) for opportunistic buy and sell trades on treated and control firms are calculated using the market model. The estimation period is from -200 to -21 days prior to the disclosure of insiders' trading. We analyze CARs for different event periods ranging from 20 days before the disclosure of insiders' trades and five, 10 and 20 days after the disclosure of insiders' trades. *t-test B* and *t-test K* denote the standardized cross-sectional test statistics proposed by Boehmer et al. (1991) and Kolari and Pynnönen (2010) respectively. *t-test* is the test statistics for the difference in CARs of opportunistic and routine trades. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Opportunistic buy				Opportunistic sell			
	(-20,-1)	(1,5)	(1,10)	(1,20)	(-20,-1)	(1,5)	(1,10)	(1,20)
Treatment (1)	-0.951	0.629	0.926	2.010	2.429	-0.297	-0.207	-0.153
t-test B	-2.50**	5.08***	5.97***	7.44***	3.71***	-2.44**	-2.44**	-2.32**
t-stat K	-2.37**	4.82***	5.65***	7.05***	3.42***	-2.25**	-2.25**	-2.13**
Control (2)	-0.781	0.136	0.613	0.924	0.894	0.278	0.356	0.487
t-test B	-3.59***	1.30	4.01***	3.55***	5.09***	1.93*	1.18	1.48
t-stat K	-2.90***	1.05	3.24***	2.86***	4.23***	1.61*	0.98	1.23
Diff (1-2)	-0.170	0.493	0.314	1.086	1.535	-0.575	-0.563	-0.640
t-test	-4.99***	3.01***	2.92***	3.01***	2.88**	-2.40**	-2.15**	-1.21

We present the results of our event study in Table 3-9. We calculate CARs using the market model.[75] First, we report the CARs for opportunistic insiders' buy trades for both the control and treatment groups for a period centered around 41 days on the reported day. The CARs for opportunistic buy trades are positive and significant at 1% for both the treatment and control groups. More importantly, the CARs for the treatment group are higher than the CARs for the control group and the difference in the CARs is statistically significant at 1%. For example, the difference in CARs ranges from 0.493% to 1.086% after the reporting of opportunistic insiders' buy trades. This further supports hypothesis 2 that FIIs earn a superior abnormal return by taking a long position on the stock bought by the opportunistic insiders.

Similarly, we also report the CARs for opportunistic insiders' sell trades for both the control and the treatment groups. The CARs for opportunistic sell trades are negative for the treatment group and statistically significant at the 5% level, while the

[75] The market return is proxied by the MSCI India Index. The estimation period for the market model is from -200 to -21 days prior to the disclosure of the opportunistic and routine insiders' trades.

CARs are positive for the control group and statistically significant at 10% for the 1-5 days window period only. The difference in CARs between the treatment and control groups ranges from -0.575% to -0.563% for 1-5 and 1-10 days window periods and are statistically significant at the 5% level. However, the difference is not significant for the 1-20 days window period. This provides partial support for our hypothesis that FIIs earn a superior abnormal return by taking the short position on the stocks sold by opportunistic insiders.

3.5.4 Robustness tests

In this section, we undertake additional checks to ensure the robustness of the above results.

3.5.4.1 Alternative definition of opportunistic and routine trades

We use an alternative definition of opportunistic and routine trades to test the robustness of our main results related to hypotheses 1 and 2, as discussed above. First, following Cohen et al. (2012b) we use the trade-level measure to define the opportunistic and routine insiders' trades, as opposed to the trader-level measure used so far. In this trade-level measure, we look at the previous three years' trading history of an insider, and categorize the insider's subsequent trade in the same month as routine trade and in a different month as opportunistic trade.[76] We test the mimicking hypothesis, a calendar-time portfolio of FIIs who mimic opportunistic and routine insiders' trades, and event study for treatment and control in Panels A, B and C of Table 3-10 respectively. As evident from all the statistics, the findings using alternative definitions of opportunistic and routine trades are similar to our main results reported in the earlier sections.

[76] For example, an insider may be classified as a routine insider if they have three straight March trades. In this trader-level measurement, we only classify her subsequent March trades as routine trades and her trades in other months as opportunistic trades.

Table 3-10: Robustness tests: Trade-level definition of opportunistic and routine traders

This table shows the results for robustness tests for the mimicking hypothesis in Panel A, calendar-time portfolio analysis in Panel B and CARs for treatment and control firms for opportunistic buy and sell trades in Panel C using a trade-level definition of opportunistic and routine traders. For the trade-level classification of inside traders, we examine the insiders' trading patterns for at least three preceding years. If an insider traded a stock in the same calendar month in three consecutive years, all subsequent trades that he or she made in the same month are labeled as routine and trades made in a different month are labeled opportunistic. Panel A shows the results of regressions between Net Equity Trading (NET_{it}) by FIIs at the reported (traded) date of insiders' trading and the trade-level definition opportunistic trades and routine trades over the sample period 2007-2014 to test the mimicking hypothesis. NET_{it}, Opportunistic (Routine) buy (sell) and control variables are defined in the notes to Table 3-3. We sort the entire sample trades for each category of insiders' trades into terciles and designate the top 33rd percentile as the large insiders' trades. We control for time and firm fixed effects. Standard errors are corrected for clustering at the firm and time levels. *t*-statistics are reported in parentheses. Panel B reports the percentage monthly returns earned on portfolios formed using the classifications of insiders' trading: Opportunistic buy (OB) and Routine buy (RB) along with Long OB-Long RB portfolio in Panel B.1., Opportunistic sell (OS)-Routine sell (RS) along with Long OS and Long RS portfolio in Panel B.2., and Long OB-Short OS and Long RB-Short RS portfolio in Panel B.3. See the notes to Table 3-8 for further description. Panel C reports the cumulative abnormal return (CARs) for alternative opportunistic buy and sell trades on treated and control firms calculated using the market model. The estimation period is from -200 to -21 days prior to the disclosure of insiders' trading. We analyze CARs for different event periods ranging from 20 days before the disclosure of insiders' trades and five, 10 and 20 days after the disclosure of insiders' trades. *t-test B* and *t-test K* denote the standardized cross-sectional test statistics proposed by Boehmer et al. (1991) and Kolari and Pynnönen (2010) respectively. *t-test* is the test statistics for the difference in CARs of opportunistic and routine trades. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

Panel A: Mimicking hypothesis

				Large Insiders' Trades		
	Model 1 (1-15)	Model 2 (1-20)	Model 3 (1-30)	Model 1 (1-15)	Model 2 (1-20)	Model 3 (1-30)
Opportunistic Buy	0.0019***	0.0025***	0.0033***	0.0025**	0.0033***	0.0039***
	(2.62)	(4.03)	(6.47)	(2.50)	(3.90)	(5.47)
Opportunistic Sell	-0.0002	-0.0000	-0.0000	0.0001	-0.0000	0.0002
	(-0.33)	(-0.09)	(-0.04)	(0.13)	(-0.02)	(0.33)
Routine Buy	0.0012	0.0020	0.0015	-0.0018	0.0002	-0.0005
	(0.40)	(0.82)	(0.79)	(-0.41)	(0.06)	(-0.17)
Routine Sell	-0.0086	-0.0062	-0.0043	0.0010	0.0002	0.0010
	(-1.61)	(-1.37)	(-1.14)	(0.28)	(0.09)	(0.41)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.129	0.119	0.108	0.163	0.147	0.140
# of Firms	440	455	469	359	372	381
# of Observations	60,522	78,277	119,377	15,983	20,429	29,501

Table 3-10: Continued

Panel B: Calendar time portfolio analysis

Portfolio	Average monthly # of trades	Average raw return (%)	Average CAR (%)	Intercept	$R_{mt} - R_{ft}$	R^2
Panel B.1. No. of months=75						
Opportunistic buy (OB)	11	2.01	1.92***	2.30***	0.89***	0.36
			(3.44)	(3.46)	(3.62)	
Routine buy (RB)	11	0.65	0.55**	0.60***	0.88***	0.33
			(2.35)	(2.85)	(3.65)	
Long OB – Long RB	22	1.36***	1.37***	1.70***	0.01	0.34
		(3.72)	(3.19)	(3.07)	(0.02)	
Panel B.2. No. of months=75						
Opportunistic sell (OS)	10	-0.77	-0.57	-0.22	0.82	0.07
			(-0.29)	(-1.04)	(1.25)	
Routine Sell (RS)	6	-0.55	-0.31	-0.21	1.18	0.07
			(-1.16)	(-1.36)	(1.12)	
Long OS – Long RS	16	-0.22	-0.26	-0.19	0.36	0.09
		(-0.49)	(-0.56)	(-0.62)	(1.42)	
Panel B.3: Long-short portfolio						
Long OB – Short OS	21	2.78***	2.49***	2.52***	0.07	0.28
		(3.29)	(3.57)	(2.62)	(0.25)	
Long RB – Short RS	17	1.20	0.86	0.81	-0.30	0.11
		(1.61)	(1.26)	(1.68)	(-1.19)	

Table 3-10: Continued

Panel C: Abnormal return of mimickers (in %)

	Opportunistic buy				Opportunistic sell			
	(-20,-1)	(1,5)	(1,10)	(1,20)	(-20,-1)	(1,5)	(1,10)	(1,20)
Treatment (1)	0.781	0.729	1.206	2.010	2.429	-0.297	-0.207	-0.153
t-test B	2.50**	5.08***	5.97***	7.44***	5.09***	-2.93***	-2.90***	-2.33**
t-test K	2.37**	4.82***	5.65***	7.05***	4.79***	-2.73***	-2.70***	-2.02**
Control (2)	0.790	0.197	0.626	1.241	2.082	0.175	0.290	0.307
t-test B	1.68*	1.87*	3.95***	4.62***	3.80***	1.25	1.97*	-1.48
t-test K	1.56	1.73*	3.67***	4.28***	3.29***	1.08	1.71*	-1.23
Diff (1-2)	-0.009	**0.532**	**0.580**	**0.769**	0.347	**-0.472**	**-0.498**	-0.460
t-test	-0.02	**2.57****	**2.73*****	**2.65*****	0.59	**-2.83*****	**-2.55****	-0.57

Further, we also use a stricter definition of routine and opportunistic insiders' trades. So far, in all our investigations, we tracked the insiders' trading for the three preceding years for the classification. As an alternative test, we now track an insider's trading for five preceding years and classify them as routine insiders if they placed a trade in the same calendar month for at least five consecutive years. Otherwise, the trader is considered to be an opportunistic trader. However, and as expected, this classification reduces the number of classified trades from 18,626 to 10,264. We present the results in the Appendix 3-7, where we test the mimicking hypothesis along with the abnormal return of FIIs who mimic. Our findings are very similar and consistent with our main results. These results demonstrate that our identification of opportunistic versus routine insiders' trading is robust to reasonable changes in the classification procedure.

3.5.4.2 Alternative definition of FIIs' trading

To further verify the robustness of our results, we follow Cohen et al. (2012b) and use change in FIIs' ownership of a firm (as a % of total stock) as an alternative measure of FIIs' trading activity.[77] We measure the change in FIIs' ownership at a quarterly frequency and regress it on the log of the number of opportunistic and routine trades in that stock. To analyze the mimicking hypothesis, we explore the lagged response by regressing 2-quarters' lagged value of the number of opportunistic and routine trades on the changes in the FIIs' holdings for the current quarter.

[77] The quarterly holding data are obtained from the Prowess database which provides financial information on listed and unlisted Indian firms. The Prowess database is widely used by existing studies (see Gopalan and Gormley 2013; Vig 2013; Gopalan, Mukherjee and Singh 2016)

Table 3-11: Robustness Tests: Using Alternative Definition of FIIs Trading

This table shows the results of regressions between changes in holdings by FIIs and the lagged routine and opportunistic insiders' trades over the sample period 2007-2014. The dependent variable is quarterly changes in holdings by FIIs in firm *i* in quarter *t.* In Models 1-3, Number of opportunistic buys (sells) is the log of 1+number of opportunistic insiders' trades in the previous two quarters and Number of routine buys (sells) is the log of 1+number of routine insiders' trades in the previous two quarters of the firm. Control variables are defined in the notes to Table 3-1. We control for time (quarter) and firm fixed effects. Standard errors are corrected for clustering at the firm and time (quarter) level. *t*-statistics are reported in parenthesis. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Model 1	**Model 2**	**Model 3**
Number of opportunistic buys	0.1280***		0.1281***
	(3.55)		(3.53)
Number of routine buys	-0.0157		-0.0157
	(-0.38)		(-0.38)
Number of opportunistic sells		-0.2112**	-0.2114**
		(-2.86)	(-2.87)
Number of routine sells		0.0006	0.0089
		(0.01)	(0.23)
Firm size	0.1002***	0.1020***	0.0992***
	(5.03)	(5.44)	(4.64)
Leverage	0.0230**	0.0231***	0.0230***
	(3.06)	(3.24)	(3.22)
Return on equity	0.2713***	0.2818**	0.2706**
	(3.19)	(2.89)	(3.13)
Cash holdings	0.9148*	0.8276	0.9126*
	(1.94)	(1.72)	(1.92)
Current ratio	0.0002	0.0002	0.0002
	(0.14)	(0.10)	(0.14)
Firm age	-0.0171	-0.0287	-0.0162
	(-0.37)	(-0.67)	(-0.35)
Board size	-0.1998	-0.2205	-0.1968
	(-0.95)	(-1.00)	(-0.91)
Board independence	0.4045	0.3637	0.4057
	(1.16)	(0.95)	(1.16)
Time (quarter) fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Adjusted R^2	0.0273	0.0233	0.0265
Number of firms	423	423	423
Number of observations	2,482	2,482	2,482

We also control for several factors that might have confounding effects on the change in FIIs' holdings. Kang and Stulz (1997), Dahlquist and Robertsson (2001), Aggarwal et al. (2005) and Ferreira and Matos (2008) all suggest that foreign investors prefer firms that are larger in size, have lower leverage, hold large cash balances, have higher return on equity, and have better current ratios. Correspondingly, we include a log of market capitalization (*Firm size), Leverage, Return on equity, Cash holdings* scaled by total assets, and *Current ratio* in our analysis. Miletkov et al. (2014) find

that FIIs show a preference for investing in firms with more independent boards and younger firms. Therefore, we also control for the log of *Board size*, the *Board independence* measured as percentage of independent directors in the board, and the log of *Firm age*. All these variables are lagged by one quarter and are sourced from the Prowess database. In addition to the time-varying control variables, we also control for time and firm fixed effects and cluster the errors at the firm and time levels. The results, using the alternative definition of FIIs' trading, are presented in Table 3-11.

Similar to the results reported by Cohen et al. (2012b), Models 1-3 show that the predictive power of opportunistic buys for future holdings of FIIs is statistically significant at the 1% level. The results also demonstrate the predictive power of opportunistic sells in explaining the future holdings of FIIs. Collectively, these tests provide support for our earlier evidence that FIIs seem to mimic the trades of past opportunistic insiders.[78]

3.5.4.3 Portfolio pumping and window dressing

We also examine the possibility that portfolio pumping, and window dressing could explain our results. Evidence suggests that institutional investors engage in trades to manipulate the prices of securities via excessive buying of the securities (usually at the quarter-end or year-end) that they already own, known as portfolio pumping (Ben-David et al., 2013; Carhart et al., 2002). Similarly, institutional investors also tend to buy (sell) securities that have performed well (poorly) toward the end of the quarter or year, to make investors believe those were their holdings throughout the quarter or year, known as window dressing (Meier and Schaumberg, 2006; Morey and O'Neal, 2006). Using daily institutional investors' trading data, Hu et al. (2014) find evidence of year-end price inflation due to the institutional selling rather than buying, but do not find evidence of window dressing by institutional investors. To address this concern, we re-conduct our main analysis in Table 3-3 excluding all month-end trading by FIIs.[79] The results are presented in Models 1-3 in Table 3-12. In this alternative setting,

[78] The results are qualitatively similar when using the alternative definition of opportunistic and routine insiders' trading discussed in Section 3.5.4.

[79] Month-end trading is defined by FIIs' net equity trading conducted during the last 5 days of one calendar month and the first 5 days of the following month.

the results are consistent and robust to our main results, supporting the mimicking hypothesis.[80]

Table 3-12: Robustness tests: Portfolio pumping and window dressing

This table shows the results of regressions between Net Equity Trading (NET_{it}) by FIIs after the disclosure of insiders' trades and the opportunistic and routine trades in Models 1-3 for different windows over the sample period 2007-2014 after excluding the month end observations. NET_{it}, Opportunistic buy, Routine buy, Opportunistic sell and Routine sell are defined in the notes to Table 3-3. All the control variables are defined in the notes to Table 3-1. We control for time and firm fixed effects. Standard errors are corrected for clustering at the firm and time level. *t*-statistics are reported in parenthesis. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Model 1 (1,15)	Model 2 (1,20)	Model 3 (1,30)
Opportunistic buy	0.0040**	0.0072***	0.0073***
	(2.41)	(3.09)	(3.83)
Routine buy	-0.0003	0.0017	0.0019
	(-0.06)	(0.52)	(0.76)
Opportunistic sell	-0.0057	-0.0048	-0.0031
	(-0.85)	(-1.05)	(-0.68)
Routine sell	-0.0013	-0.0019	-0.0013
	(-0.83)	(-0.80)	(-0.74)
Stock return	0.1786**	0.1995**	0.2001**
	(1.97)	(2.14)	(2.42)
Firm size	0.0059	0.0067	0.0056
	(0.85)	(1.07)	(0.87)
Book-market	-0.0152**	-0.0154**	-0.0122**
	(-2.43)	(-2.44)	(-2.39)
Turnover	0.7096	2.1764*	2.6928**
	(0.48)	(1.95)	(2.40)
Stock volatility	-0.7382**	-0.5401	-0.4343
	(-2.02)	(-1.59)	(-1.18)
Time fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Adjusted R^2	0.1679	0.1563	0.1056
Number of firms	416	431	451
Number of observations	40,337	52,527	80,419

[80] The results are qualitatively similar when using alternative definition of opportunistic and routine insiders trading discussed in Section 3.5.4.

3.6 Conclusion

The empirical evidence on whether insiders' trading contains superior information about their company is mixed. Recently it has been argued that uninformative trades conducted by insiders, such as those which are routine in nature and for liquidity needs, do not earn any abnormal returns or predict future returns. However, opportunistic insider trades (trades that are not routine in nature) provide highly relevant information that results in a higher market reaction. However, this evidence is largely clustered in developed markets, and to the best of our knowledge, there is no empirical evidence on the information content of opportunistic and routine insider trading in the context of emerging markets Given that emerging markets suffer from lower enforcement of insider trading regulations and lower probability of prosecution, we argue that insiders' trades in such a setting should offer higher information content. Further, considering the evidence that FIIs in emerging markets have an information disadvantage compared to DIIs, the former tends to follow the market trends and chase the recent stock returns due to higher levels of information asymmetry. Since FIIs have greater incentives to pay attention to the opportunistic insiders' trading behavior due to their information inferiority, we examine whether FIIs mimic the trading direction of the past opportunistic insiders and if so, do they earn superior abnormal returns?

We find robust evidence that opportunistic insiders' trades, particularly buy trades, have higher information content in emerging markets compared to the developed market. We show that opportunistic trades, on average, earn incremental returns of approximately 243 basis points in the following month of trade in the Indian emerging market compared to 158 basis points reported for developed markets. Most importantly, we find consistent evidence of FIIs mimicking the opportunistic insiders' buy trades but not the sell trades. We show that FIIs mimic the opportunistic buy trades within 15 days of the disclosure of such trades. Further, this relation strengthens for large opportunistic insiders' buy trades. However, our findings also suggest that FIIs view opportunistic sell and routine buy and sell trades as uninformative. Further, using a calendar-time portfolio analysis as well as an event study approach, we find that FIIs who mimic opportunistic buy trades earn significantly higher returns compared to FIIs who mimic routine insiders' buy trades.

Collectively, our results suggest that compared to the developed market, the information content of insiders' trading is higher in emerging markets that can be exploited by outside investors, such as FIIs who are informationally challenged, to mitigate the challenge of information asymmetry present in such markets.

Appendix 3-1: Correlation matrix

The table presents the correlation matrix for the variables included in the empirical analysis. Stock return is the return on the firm. Firm size is defined as the market capitalization of the firm in millions of Indian Rupees (INR). Book-market is the ratio of book value per share to the market price of the firm. Turnover is the percentage of total number of shares traded by the total number of shares outstanding of the firm. Stock volatility is the daily standard deviation of stock return calculated using the previous 90 days' stock return. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

		(1)	(2)	(3)	(4)	(5)
Stock return	(1)	1				
Firm size	(2)	0.090***	1			
Book-market	(3)	-0.021***	0.004**	1		
Turnover	(4)	0.004**	-0.065***	-0.366***	1	
Stock volatility	(5)	0.004**	0.120***	0.427***	-0.315***	1

Appendix 3-2: Information content of insiders' trading

This table replicates the analysis of Cohen et al. (2012b) in the context of an emerging market. Model 1 reports the pooled regression (with firm and time (month) fixed effects) and Model 2 reports the Fama-MacBeth (1973) regression of returns on the indicator of opportunistic and routine insiders' trade in the prior month, over 2007-2014 sample period. The dependent variable is the one-month future stock return. D(Opportunistic buy) (D(Routine buy)) is a binary variable that takes the value of 1 if there were any buy on a given firm in the prior month by an opportunistic (routine) insider. D(Opportunistic sell) and D(Routine sell) are defined similarly for insider sales. Size and Book-market ratio are natural log of the market capitalization and book-to-market ratio in the prior month end. Past month (year) return is the return of the given firm over the prior month (year, excluding the prior month (*t*-2, *t*-12). Standard errors are corrected for clustering at the firm and time level in Model 1. *t*-statistics are reported in parenthesis. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Future one-month stock return	
	Pooled regression	Fama-MacBeth regression
	Model 2	Model 1
D(Opportunistic buy)	1.7391***	1.1309***
	(3.09)	(3.63)
D(Routine buy)	-1.1862	-0.9992
	(-0.90)	(-1.07)
D(Opportunistic sell)	1.6300	0.6916
	(0.22)	(1.64)
D(Routine sell)	0.7492	0.2336
	(0.36)	(1.30)
Firm size	-8.4922***	-0.5035**
	(-4.63)	(-2.00)
Book-market	8.0619***	0.8104
	(3.91)	(0.85)
Past month return	0.0293***	0.0187***
	(3.74)	(3.36)
Past year return	-0.0018	-0.0051
	(-0.13)	(-0.49)
Firm fixed effects	Yes	No
Time (month) fixed effects	Yes	No
Adjusted/Average R^2	0.096	0.3130
Number of firms	537	537
Number of observations	4,869	4,869

Appendix 3-3: Information content of insiders' trading: Ali and Hirshleifer (2017) measure

In this section, we use the Ali and Hirshleifer (2017) identification strategy to classify the insiders' opportunistic trades. First, we calculate the profitability of each pre-quarterly earnings announcement (QEA) trade as the average market-adjusted return in the five-day window surrounding the QEA date.[81] We use return in MSCI India index as return on market. The pre-QEA period is the 21-trading day period ending two trading days prior to the QEA date. Next, we calculate the average profitability of insider's past pre-QEA trades for each insider, for each year, as:

$$Average\ profit = (\sum Profit_{(buy)} - \sum Profit_{(sell)})/(B + S) \qquad \text{(A3.5)}$$

where B and S is the total number of buy and sell pre-QEA trades respectively, *Profit* is the average profitability of *buy* and *sell* trades of insiders. At the beginning of each year, the insiders are ranked into quintiles based upon *Average profit.* Panel A of Table A3-3 shows the summary statistics that provide the insider's characteristics. We identify around 42% of the insiders from the insider universe who made at least one pre-QEA trades. Almost half of the buy and sell trades are made by these insiders. 72% of the firms in the insiders' universe have at least one ranked insider. Ali and Hirshleifer (2017)'s measure identifies larger number of insiders, insiders' trades and firms compared to Cohen et al. (2012b) measure as the insider are re-classified every year based on their past pre-QEA profitability. The profitability of Quintile 5 insiders' past pre-QEA trades are higher compared to other insiders as they earn on average 9.4% more than the market during the five-day QEA window. The trades by these insiders are identified as opportunistic trades. These results are consistent with Ali and Hirshleifer (2017).

In Panel B of Table A3-3, we examine the information content of trades by opportunistic insiders (quintile 5). We perform a multivariate analysis where the main dependent variable is future one-month stock return. We run a pooled regression with

[81] The QEA dates are collected from Prowess database that provide details of all the board meetings such as board meeting dates and purpose. We identify the board meetings dates who purpose (abbreviated) is listed as "QTR" denoting quarterly results announcements. We focus on the latest QEA dates if the difference in the two subsequent QEA dates is less than a month (for example: revised QEA announcements).

standard errors clustered at the time and firm level and include time (month) and firm fixed effects in Model 1 and Fama-MacBeth (1973) regressions in Model 2.

Our main variables of interest are D(Quintile 5 buy), D(Quintile 5 sell), D(Other buy) and D(Other sell). D(Quintile buy) is a binary variable that takes the value of 1 if there were any quintile 5 buys on a given firm in the prior month and 0 otherwise. D(Other buy) is a binary variable that takes the value of 1 if there we any quintile 1-4 buys on a given firm in the prior month and 0 otherwise. The definition of D(Quintile 5 sell) and D(Other sell) is similar. The control variables are same as Table 3-2. Our results are qualitatively similar to the results reported in Table 3-2 of the main text and Appendix 3-2.

Table A3-3. Information content: Ali and Hirshleifer (2017) measure

This table reports the summary statistics and analysis of mimicking hypothesis using alternative measure of opportunistic trades. We use Ali and Hirshleifer (2017) identification strategy to classify the insiders' opportunistic trades. First, we calculate the profitability of each pre-QEA trade as the average market-adjusted return in the five-day window surrounding the QEA date. The pre-QEA period is the 21-trading day period ending two trading days prior to the QEA date. Next, we calculate the average profitability of insider's past pre-QEA trades for each insider, for each year, as:$Average\ profit = (\sum Profit_{(buy)} - \sum Profit_{(sell)})/(B + S)$ where B and S is the total number of buy and sell pre-QEA trades respectively, *Profit* is the average profitability of *buy* and *sell* trades of insiders. At the beginning of each year, the insiders are ranked into quintiles based upon *Average profit*. Panel A reports the insider level characteristics. Panel B presents the regression analysis using alternative identification of opportunistic trades. Model 1 reports the pooled regression (with firm and time (month) fixed effects) and Model 2 reports the Fama-MacBeth (1973) regression of returns on the indicator of opportunistic and routine insiders' trade in the prior month, over 2007-2014 sample period. The dependent variable is the one-month future stock return. D(Quintile buy) is a binary variable that takes the value of 1 if there were any quintile 5 buys on a given firm in the prior month and 0 otherwise. D(Other buy) is a binary variable that takes the value of 1 if there we any quintile 1-4 buys on a given firm in the prior month and 0 otherwise. The definition of D(Quintile 5 sell) and D(Other sell) is similar. Size and Book-market ratio are natural log of the market capitalization and book-to-market ratio in the prior month end. Past month (year) return is the return of the given firm over the prior month (year, excluding the prior month (*t*-2, *t*-12). Standard errors are corrected for clustering at the firm and time level in Model 1. *t*-statistics are reported in parenthesis. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

Panel A: Summary statistics for alternative opportunistic trades

Rank (Quintile)	Number of unique insiders	Number of unique firms	Number of buys	Number of sells	Average pre-QEA profitability	
1	1,442	834	3,520	2,189	-1.77%	-1.42%
2	1,413	782	3,236	3,094	-0.39%	-0.35%
3	1,340	780	5,663	2,795	0.03%	0.01%
4	1,428	810	4,635	2,902	0.49%	0.34%
5	1,424	839	3,940	2,058	1.90%	1.48%
Insider universe (1)	14,003	2,542	41,582	25,679		
Ranked universe (2)	5,827	1,834	20,994	13,038		
(2) / (1)	0.42	0.72	0.50	0.51		

Panel B: Information content of alternative opportunistic trades

	Future one-month stock return	
	Pooled regression	FM Regression
Quintile 5 buy	1.2245***	1.1545***
	(3.29)	(3.04)
Quintile 5 sell	-0.4368*	-0.5944*
	(-1.75)	(-1.73)
Other buy	-0.9947	0.5244
	(-1.65)	(0.74)
Other sell	-0.5156	0.2944
	(-0.52)	(0.95)
Firm size	-6.6870***	-0.6703***
	(-5.65)	(-4.97)
Price-book	4.0559*	1.2915***
	(1.86)	(4.71)
Past month return	0.0486***	0.0171***
	(3.74)	(3.09)
Past month return	0.0005	-0.0077
	(0.04)	(-1.45)
Time fixed effects	Yes	No
Firm fixed effects	Yes	No
Adjusted/Average R^2	0.0770	0.1443
Number of firms	1,209	1,209
Number of observations	12,880	12,880

Appendix 3-4: Information content of insiders' trading: an event study

In this section, we compute the cumulative abnormal returns (CARs) by using the market model for a period of 41 days centred on the reported day of opportunistic and routine insiders' trades.[82] The market return is proxied by the MSCI India Index.[83] The estimation period for the market model is from -200 to -21 days prior to the disclosure of the opportunistic and routine insiders' trades. To test the null hypothesis that the CARs are equal to zero for a sample of *N* securities, we use two parametric tests statistics: *t-test B*, based on Boehmer et al. (1991) and *t-test K,* based on Kolari and Pynnönen (2010).

Table A3-4 reports the results of the market reaction to opportunistic and routine trades. The table also reports the market reaction based on the intensity of these trades. For the classification of insiders' trading intensity, we sort entire sample for each category of insiders' trades into terciles and define the top 33rd percentile as the *Large* insiders' trading intensity, bottom 33rd percentile as the *Small* insiders' trading intensity and the remainder as the *Medium*.

The results in Table A3-4 provide evidence that CARs of opportunistic and routine insiders' buy (sell) trades is positive (negative). For overall Opportunistic buy trades, the 5-day CAR based on the reported day from the market model is 0.506% that increases to 1.308% for the 20-day period and is significant at 1% regardless of the test statistics used. For overall Routine buy trades, the 5-day and 20-day CARs based on the reported day from the market model is 0.347% and 0.651% respectively and is significant at 1%. The CAR is positive but not significant over the 20 days prior to the reported date of Opportunistic and Routine Buy. This suggests that insiders can time their purchases. The results are in line with Cohen et al. (2012b), Tirapat and Visaltanachoti (2013), Kraft et al. (2014) and Ali and Hirshleifer (2017).

Similarly, Table A3-4 shows that the market reacts negatively to the announcement of both Opportunistic and Routine sell. The CARs for Opportunistic sell and Routine sell measured over the reported day and after the 5-day (20-day)

[82] We also use the Market Adjusted Return model to calculate the CARs and find similar results.

[83] MSCI India Index measures the performance of large and medium cap segments of the Indian market and it covers approximately 85% of the Indian equity universe.

period is -0.378% (-0.749%) and -0.319% (-0.039%) respectively and are all significant at 1%. The negative CARs follow a period of significant positive abnormal returns of about 1.678% for Opportunistic sell and 2.122% for Routine sell over the 20 days. As with buy trades, insiders seem to be able to time their sales very well. We conclude that both buy and sell trades are informative and can be interpreted as a signal for positive and negative news respectively. We find that the absolute market reaction to insiders' purchases (both opportunistic and routine) is higher than that of sales (both opportunistic and routine). The results are in line with Lakonishok and Lee (2001) and Fidrmuc et al. (2006).

Next, we calculate the difference in abnormal return between the Opportunistic buy and Routine buy as well as between the Opportunistic sell and Routine sell. We find that the CARs for Opportunistic buy is higher than the Routine buy and there is a significant difference in CARs between these two trades. For example, the difference in CAR for the 20-day period after the reported day is 0.656% and it is significant at 1%. However, there is no significant difference in CARs between Opportunistic and Routine sell up to the 10-day period after the reported date, though the difference is weakly significant for the 20-day period. We also conduct a similar analysis for large, medium and small insider sales.[84] Overall, our results remain qualitatively similar.

[84] We find the higher market reaction to larger insiders' trades compared to the smaller insiders' trades. Furthermore, the CARs for all Opportunistic buy (Routine buy) is on average 70% (87%) of that of large Opportunistic buy (Routine buy), while the CARs for all Opportunistic Sell (Routine Sell) is on average 54% (29%) of that of large Opportunistic sell (Routine sell).

Table A3-4: Market reaction to routine and opportunistic insiders' trades

This table reports the cumulative abnormal return (CARs) for opportunistic trades (buy and sell) and routine trades (buy and sell) around the reported dates of such trades based on all insiders' trades and based on intensity of insiders' trading using market model. MSCI India Index return is used as a proxy for the market return. The estimation period is from -200 to -21 days prior to the disclosure of insiders' trading. We analyse CARs for different event period ranging from 20 days before the disclosure of insiders' trades and five, 10 and 20 days after the disclosure of insiders' trades. See notes to Table 3-1 for the definition of opportunistic and routine trades. For the classification of insiders' trading intensity, we sort entire sample for each category of insider's trades into terciles and define the top 33rd percentile as the *Large* insiders' trading intensity, bottom 33rd percentile as the *Small* insiders' trading intensity and rest as the *Medium*. *t-test B* and *t-test K* denotes the standardized cross-sectional test statistics proposed by Boehmer et al. (1991) and Kolari and Pynnönen (2010) respectively. *t-test* is the test statistics for the difference in CARs of opportunistic and routine trades. *, **, and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Overall				**Insiders' trading intensity**											
					Large				**Medium**				**Small**			
	(-20,-1)	**(1,5)**	**(1,10)**	**(1,20)**	**(-20,-1)**	**(1,5)**	**(1,10)**	**(1,20)**	**(-20,-1)**	**(1,5)**	**(1,10)**	**(1,20)**	**(-20,-1)**	**(1,5)**	**(1,10)**	**(1,20)**
Opportunistic buy (1)	0.428	0.506	0.735	1.308	1.109	0.804	1.329	1.444	0.533	0.662	1.084	1.602	-0.931	0.509	0.559	1.139
t-test B	0.30	5.24***	5.03***	5.67***	1.2	5.55**	6.26**	4.99***	0.52	3.63***	4.02***	4.19***	-4.77***	2.77***	3.13***	5.41***
t-stat K	0.27	4.64***	4.36***	4.84***	1.85*	5.22**	5.97*	4.19***	0.46	3.04***	3.28***	3.43***	-4.01***	2.32**	2.63***	4.41***
Routine buy (2)	0.404	0.347	0.409	0.651	1.114	0.347	0.478	0.877	0.881	0.361	0.762	-0.080	-1.720	-0.149	0.092	0.890
t-test B	1.27	2.18**	3.29***	2.67***	0.66	2.83***	2.70***	3.10***	1.52	1.16	1.75*	-0.62	-3.44***	-0.29	0.15	1.20
t-stat K	1.14	1.97*	2.98***	2.41**	0.59	2.52**	2.29**	2.75***	1.32	1.00	1.51	-0.54	-3.16***	-0.27	0.14	1.10
Diff (1-2)	0.024	**0.159**	**0.326**	**0.656**	0.494	**0.457**	**0.851**	**0.566**	-0.347	**0.301**	**0.321**	**1.683**	0.789	**0.658**	**0.467**	**0.249**
t-test	0.90	**2.02****	**2.11****	**2.86*****	0.71	**2.41****	**3.86*****	**2.00****	-0.58	**2.01****	**2.77*****	**3.75*****	1.46	**2.35****	**2.89*****	**1.86***
Opportunistic sell (3)	1.678	-0.378	-0.454	-0.749	-0.499	-0.603	-1.169	-1.251	3.484	-0.222	-0.136	-0.617	1.963	-0.181	-0.096	-0.402
t-test B	6.59***	-3.82***	-3.80***	-4.59***	-1.68*	-3.16***	-3.59***	-3.37***	9.09***	-2.04**	-1.62	-2.96***	8.58***	-1.06	-0.59	-2.47***
t-stat K	5.84***	-3.38***	-3.36***	-4.07***	-1.34	-2.51**	-2.85***	-2.68***	7.68***	-1.72*	-1.37	-2.50**	7.77***	-0.96	-0.53	-2.33***
Routine sell (4)	2.122	-0.319	-0.215	-0.039	3.096	-0.769	-0.645	-0.309	1.809	-0.178	-0.185	-0.159	1.462	-0.143	0.188	0.350
t-test B	7.43***	-3.40***	-2.05**	-1.97*	4.93***	-3.41***	-2.52**	-2.49**	3.62***	-1.09	-1.22	-1.33	4.24***	-1.37	0.20	0.40
t-stat K	7.17***	-3.28***	-1.98**	-1.90*	4.24***	-2.93***	-2.17**	-2.14**	3.15***	-0.95	-1.07	-1.16	3.99***	-1.29	0.19	0.38
Diff (3-4)	0.445	-0.059	-0.240	**-0.711**	-3.595	0.166	-0.524	**-0.942**	1.675	-0.044	0.049	**-0.458**	0.501	-0.038	-0.284	**-0.752**
t-test	1.07	-0.34	-0.96	**-1.87***	-3.47***	0.40	-0.84	**-1.96****	2.81***	-0.17	0.14	**-1.93***	1.37	-0.21	-0.79	**-2.20****

Appendix 3-5: Sub-sample analysis of cross-listed firms

This table shows the result of regressions between Net Equity Trading (NET_{it}) by FIIs after the disclosure of insiders' trades for different periods (15, 20 and 30 days after the disclosure of insiders' trading) and the opportunistic and routine trades over the sample period 2007-2014 for sub-sample of cross-listed firms. NET_{it} is defined as the number of shares traded by all FIIs scaled by previous day's number of shares outstanding of firm *i* in day *t* (reported in pbs units). The main independent variables are Opportunistic buy, Routine buy, Opportunistic sell and Routine sell. Opportunistic buy (sell) is the number of shares bought (sold) by opportunistic insiders scaled by previous day's number of shares outstanding of the firm on the reported date. Routine buy (sell) is the number of shares bought (sold) by routine insiders scaled by previous day's number of shares outstanding of the firm on the reported date. The control variables are defined in the notes to Table 3-1 of the main text. We control for time and firm fixed effects. Standard errors are corrected for clustering at the firm and time level. *t*-statistics are reported in parenthesis. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Cross-listed firms		
	Model 1 (1-15)	**Model 2 (1-20)**	**Model 3 (1-30)**
Opportunistic buy	0.0013*	0.0021**	0.0023***
	(1.76)	(2.16)	(2.74)
Routine buy	-0.0001	0.0003	0.0007
	(-1.39)	(1.39)	(0.65)
Opportunistic sell	-0.0026	-0.0025	-0.0058
	(-0.44)	(-0.49)	(-0.79)
Routine sell	-0.0014	-0.0008	-0.0002
	(-0.64)	(-0.39)	(-0.18)
Stock return	0.4018***	0.4052***	0.4112***
	(5.97)	(5.94)	(6.21)
Firm size	0.0194*	0.0157	0.0152*
	(1.86)	(1.63)	(1.73)
Book-market	-0.0169	-0.0134	-0.0159
	(-0.92)	(-0.73)	(-0.93)
Turnover	2.4590***	4.0434***	3.7863***
	(4.08)	(4.73)	(4.41)
Stock volatility	-0.8015	-0.7471	-0.7122
	(-1.44)	(-1.48)	(-1.59)
Time fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Adjusted R^2	0.0972	0.0696	0.0663
Number of firms	89	89	89
Number of observations	24,578	31,129	47,577

Appendix 3-6: Mimicking hypothesis: Ali and Hirshleifer (2017) measure

This table shows the result of regressions between Net Equity Trading (NET_{it}) by FIIs after the disclosure of insiders' trades for different periods (15, 20 and 30 days after the disclosure of insiders' trading) and the insiders' trades over the sample period 2007-2014. NET_{it} is defined as the number of shares traded by all FIIs scaled by previous day's number of shares outstanding of firm i in day t. The main independent variables are Quintile 5 buy, Quintile 5 sell, Other buy and Other sell. Quintile 5 buy (Quintile 5 sell) is the number of shares bought (sold) by insiders ranked in quintile 5 scaled by the previous day's number of outstanding shares. Other buy (sell) is the number of shares bought (sold) by insider ranked in quintile 1 to 4 scaled by the previous day's number of outstanding shares. The control variables are similar to those in Table 3-3 and defined in the notes to Table 3-1 of the main text. We control for time and firm fixed effects. Standard errors are corrected for clustering at the firm and time level. *t*-statistics are reported in parenthesis. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Model 1 (1-15)	Model 1 (1-20)	Model 1 (1-30)
Quantile 5 buy	0.0063**	0.0065***	0.0062***
	(2.26)	(2.60)	(2.92)
Quantile 5 sell	-0.0005	-0.0003	-0.0002
	(-0.34)	(-0.26)	(-0.14)
Other buy	-0.0010	-0.0006	-0.0011
	(-0.95)	(-0.54)	(-0.98)
Other sell	-0.0001	-0.0002	-0.0005
	(-0.10)	(-0.17)	(-0.52)
Stock return	0.3245***	0.3187***	0.3055***
	(8.23)	(8.26)	(7.63)
Size	0.0068	0.0057	0.0017
	(1.02)	(0.91)	(0.30)
Book-market	-0.0104**	-0.0104**	-0.0130**
	(-2.35)	(-2.40)	(-2.36)
Turnover	0.7179**	0.6936***	0.7901**
	(2.35)	(2.97)	(2.40)
Stock volatility	-0.1493	-0.1322	-0.1677
	(-0.76)	(-0.74)	(-0.98)
Time fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Adjusted R^2	0.1676	0.1567	0.1380
Number of firms	768	787	812
Number of observations	125,800	162,383	246,866

Appendix 3-7: Robustness Test: Using Past Five Years' Trading History

This table shows the result for robustness test for mimicking hypothesis in Panel A, calendar-time portfolio analysis in Panel B and CARs for treatment and control firms for opportunistic buy and sell trades using trade-level definition of opportunistic and routine traders. For the classification of insiders' trades, in this alternate setting, an insider must make at least one trade in each of five preceding years. A routine trader is an insider who placed a trade in the same calendar month for at least five consecutive years. Otherwise, the trader is considered as an opportunistic. An insider will be classified as either routine or opportunistic at the beginning of each year and all subsequent trades after the classification are then classified as either routine buy (sell) or opportunistic buy (sell) trades. Panel A shows the result of regressions between Net Equity Trading (NET_{it}) by FIIs at the reported date of insiders' trading and the alternative opportunistic trades and routine trades over the sample period 2007-2014 to test mimicking hypothesis. NET_{it} is defined as the number of shares traded by all FIIs scaled by previous day's number of shares outstanding of firm *i* in day *t* (reported in pbs units). Opportunistic buy (sell) is the number of shares bought (sold) by opportunistic insiders scaled by previous day's number of shares outstanding of the firm on the reported date. Routine buy (sell) is the number of shares bought (sold) by routine insiders scaled by previous day's number of shares outstanding of the firm on the reported date. Control variables are same as in Table 3-4. We sort the entire sample trades for each category of insider's trades into terciles and designate the top 33rd percentile as the large insiders' trades. We control for time and firm fixed effects. Standard errors are corrected for clustering at the firm and time level. Panel B reports the percentage monthly returns earned on portfolios formed using four different classification of insiders' trading: Opportunistic buy (OB) and Routine buy (RB) along with Long OB-Long RB portfolio in Panel B.1., Opportunistic sell (OS)-Routine sell (RS) along with Long OS and Long RS portfolio in Panel B.2., and Long OB-Short OS and Long RB-Short RS portfolio in Panel B.3. See notes to Table 3-7 for further description. Panel C reports the cumulative abnormal return (CARs) for alternative opportunistic buy and sell trades on treated and control firms calculated using market model. The estimation period is from -200 to -21 days prior to the disclosure of insiders' trading. We analyse CARs for different event period ranging from 20 days before the disclosure of insiders' trades and five, 10 and 20 days after the disclosure of insiders' trades. *t-test B* and *t-test K* denotes the standardized cross-sectional test statistics proposed by Boehmer et al. (1991) and Kolari and Pynnönen (2010) respectively. *t-test* is the test statistics for the difference in CARs of opportunistic and routine trades. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively

Panel A: Mimicking hypothesis

				Large insiders' trades		
	Model 1 (1-15)	Model 2 (1-20)	Model 3 (1-30)	Model 1 (1-15)	Model 2 (1-20)	Model 3 (1-30)
Opportunistic buy	0.0127**	0.0167***	0.0158***	0.0157***	0.0161***	0.0158***
	(1.99)	(3.04)	(3.40)	(3.76)	(4.02)	(4.15)
Opportunistic sell	0.0007	-0.0006	-0.0016	-0.0019	-0.0025	-0.0040
	(0.50)	(-0.51)	(-1.59)	(-0.20)	(-0.32)	(-0.61)
Routine buy	-0.0063	-0.0098	-0.0116	-0.0007	-0.0004	-0.0006
	(-0.31)	(-0.56)	(-0.81)	(-0.81)	(-0.59)	(-0.95)
Routine sell	0.0009	0.0008	0.0009	-0.0003	-0.0002	-0.0005
	(1.17)	(1.22)	(1.60)	(-0.33)	(-0.30)	(-0.69)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.1606	0.1491	0.1320	0.1584	0.1489	0.1244
Number of firms	233	237	244	182	201	216
Number of observations	35,107	45,377	69,189	10,486	13,378	19,376

Appendix 3-7: Continued

Panel B: Calendar-time portfolio analysis

Portfolio	Average monthly # of trades	Average taw return (%)	Average CAR (%)	Intercept	$R_{mt} - R_{ft}$	R^2
Panel B.1. No. of months=95						
Opportunistic buy (OB)	16	2.96	2.11***	1.91***	1.35***	0.43
			(3.13)	(5.08)	(4.29)	
Routine buy (RB)	10	1.20	0.74**	1.09***	0.96***	0.17
			(2.19)	(4.88)	(3.43)	
Long OB – Long RB	26	1.76***	1.37***	-0.82**	0.39	0.30
		(3.36)	(2.97)	(2.40)	(1.20)	
Panel B.2. No. of months=75						
Opportunistic sell (OS)	11	-1.46	-0.51	1.41	0.89***	0.41
			(-0.55)	(1.37)	(7.09)	
Routine sell (RS)	8	-0.35	-0.16	-.30**	0.25	0.03
			(0.24)	(-1.84)	(0.96)	
Long OS – Long RS	19	-1.11	-0.35	1.04**	0.64**	0.34
		(-0.74)	(-0.52)	(2.10)	(2.02)	
Panel B.3: Long-short portfolio						
Long OB – Short OS	27	4.42***	2.62***	0.50***	0.46***	0.48
		(4.27)	(2.45)	(4.07)	(2.04)	
Long RB – Short RS	18	1.55**	1.53	1.39**	0.71***	0.32
		(2.47)	(1.14)	(2.49)	(3.17)	

Panel C: Abnormal return of mimickers (in %)

	Opportunistic buy				Opportunistic sell			
	(-20,-1)	(1,5)	(1,10)	(1,20)	(-20,-1)	(1,5)	(1,10)	(1,20)
Treatment (1)	0.781	0.929	1.226	2.010	2.429	-0.347	-0.327	-0.263
t-test B	2.50**	5.08***	5.97***	7.44***	5.09***	-1.93*	-2.74***	-3.33***
t-test K	2.37**	4.82***	5.65***	7.05***	4.23***	-1.61	-2.38**	-2.89***
Control (2)	0.172	0.258	0.359	1.123	1.838	0.191	0.387	0.538
t-test B	0.11	0.55	2.44**	2.60**	3.46***	1.83*	1.18	1.48
t-test K	0.10	0.52	2.29**	2.43**	3.01***	1.59	0.98	1.23
Diff (1-2)	0.609	**0.671**	**0.867**	**0.887**	0.591	**-0.538**	**-0.714**	**-0.801**
t-test	1.46	**3.00****	**2.73****	**3.59****	1.02	**-1.90***	**-3.07****	**-3.11****

Chapter 4. Do foreign institutional investors improve the board monitoring?

4.1 Brief introduction

The influence of foreign investors on corporate governance of firms in emerging markets has attracted much attention in the literature. Activist "outside" shareholders, particularly FIIs, are likely to perform arm-length monitoring and reduce the expropriation by controlling shareholders, thereby benefiting the minority shareholders (Huang and Zhu, 2015). Understanding the role of FIIs in improving the monitoring is particularly important in emerging markets that are typically affected by the "twin agency" problems of corporate insider and state ruler discretion (Stulz, 2005). However, the concern of endogeneity on the relationship between FIIs and board monitoring has been a major challenge in establishing a causality. In this study, we use financial crisis of 2007-08, which resulted in significant decline in FIIs' ownership in India, as an exogenous shock.

The use of this setting allows us to answer two research questions: first, whether FIIs improve board monitoring, and second, whether FIIs play moderating role in relation between board monitoring and firm performance. We identify seven proxies to measure the board monitoring, namely, board size, board independence, board busyness, board diligence, network size, CEO power, and CEO pay level. Likewise, we use firm value (measured using Tobin's q, return on assets, EPS, PBDITA, and assets turnover ratio), and innovation (measured using patent count, and R&D expenses) as a proxy for firm performance.

We establish a causal evidence, addressing the concerns of endogeneity, by employing a difference-in-differences approach in which we compare the level of board monitoring before and after crisis as a function of firms' FIIs' ownership measured prior to the onset of the crisis. We identify a treatment group as those firms who have high FIIs ownership (but no/low DIIs ownership) prior to the crisis and a control group as those firms who have high DIIs ownership (but no/low FIIs ownership). We use propensity score matching to identify a matched set of treatment and control firms eliminating any differential firm level preferences by FIIs.

In summary, we find that higher FIIs' ownership is associated with decrease in board size, board busyness, network size, CEO power and their pay, whereas it is associated with increase in board diligence. Interestingly, we find FIIs decrease board independence, even though, conventional wisdom suggests board monitoring of firms improve with higher board independence. Finally, we find that the improvement in the board monitoring by FIIs is also associated with higher firm performance and improved innovation activities.

Our study contributes to two strands of literature. First, the study relates to the literature that examines the role of FIIs in corporate governance and board monitoring (Aggarwal et al., 2011; Gillan and Starks, 2003; Huang and Zhu, 2015). Our study shows that FIIs as large shareholders are effective monitors, identifying such institutions as an important type of active monitors.

A more detailed discussion of the questions, findings and contributions is in Section 1.2.3 and Section 1.4.3. The remainder of the study is organized as follows. A brief discussion of corporate governance in India is presented in Section 4.2 and a review of literature and testable hypothesis is presented in Section 4.3. In Section 4.4, we discuss the data sources and all the variables used in this study, along with a discussion of the financial crisis as an exogenous shock and the identification strategy. Section 4.5 presents a discussion of empirical findings that include quasi-natural experiments, robustness tests and results on testable implications. Finally, Section 4.6 concludes the study.

4.2 Corporate governance in India

The growth of securities market post-liberalization era also led to plethora of scams that rocked the Indian business scene, hence, it became important to implement a good corporate governance practice as a solution to the problem (Dharmapala and Khanna, 2013; Chakrabarti et al., 2008). The first step towards formulation of corporate governance reforms occurred after Confederation of Indian Industry (CII) proposed a voluntary code of corporate governance. Soon, SEBI formulated Birla Committee to fashion a code of corporate governance and introduced Clause 49 into Listing Agreement of Stock Exchanges. Black and Khanna (2007) provide further overview of the history of corporate governance reform in India and the background for the

Clause 49 reform. In 2003, SEBI instituted Murthy Committee to examine the governance framework and make recommendations to improve its effectiveness. SEBI implemented the recommendations and the Clause 49 was fully implemented on January 1, 2006.

Each of the committee recommendations (CII, Birla Committee and Murthy Committee) has shaped a formulation of sophisticated corporate governance code in India. For instance, while the Birla Committee required that only majority and chair of the audit committee be independent and at least one financially literature, the Murthy Committee recommended the audit committee be comprised entirely of financially literate non-executive directors. However, the most important aspect of the reform is a required change in the board structure: when the chairman of the board is a non-executive director, at least one-third of the Board should be independent directors and when the chairman is executive, at least half of the Board should be independent directors. Likewise, at least half of the Board had to consist of non-executive directors. Further, it also mandates that two-third of the members of audit committee to be independent. Firms were also required to submit quarterly compliance reports to SEBI and failure to meet requirements of Clause 49 were subject to fines (financial and criminal penalties) and delisting. Helmers et al. (2017) and Sarkar (2009) indicate that very few firms (around 4%) did not comply with the required board structure requirements. However, the industry research by Moody in 2005 discovered that in several companies the independent directors only represented 25% to 30% of the board strength and their selection were largely through friends and relative. Likewise, PwC India survey in 2015-16 found that around 12% of the companies' directors are related to promoters and 25% are related to the CEO or the chairperson. It suggested that board of directors were not independent in a true sense. Taken together, the provisions related to good corporate governance practices has significantly improved over the course of time, however, the compliance of the codes to its words and spirit is still in nascent stage.

4.3 Review of literature and hypothesis development

Prior literature argues that FIIs, by the virtue of their large shareholding, have the ability (through voting rights) and the incentive (through cash-flow rights) to monitor

the board and the management.[85] As FIIs' investment in emerging markets has increased, this can influence corporate governance either through direct intervention or through indirect supply and demand effects.[86] It is argued that FIIs' monitoring is primarily targeted at enhancing firms' long-term performance (Bena et al., 2017). For instance, Ferreira and Matos (2008) find that FIIs' pressure can curtail a managers' incentives to (over)invest, providing evidence that FIIs can influence firm value through monitoring.[87] Similarly, Aggarwal et al. (2011) find that FIIs play a dominant role in improving firm-level governance located in countries with weak shareholder protection.[88] Finally, Huang and Zhu (2015) suggest that FIIs perform arms-length monitoring to limit expropriation by controlling shareholders by promoting the rule of market-based principles in corporate voting and governance practices.

Based on these arguments, we suggest that FIIs have incentives to influence the effectiveness of board monitoring in the firms they chose to invest for a number of reasons. First, by the virtue of being "foreign", these FIIs act as independent monitors as they are less prone to have links in business or ties with the host firms (Aggarwal et al., 2011; Bena et al., 2017; Gillan and Starks, 2003; Kim et al., 2016). As they are less burdened by ties to corporate insiders, FIIs can help reduce the agency cost by improving the quality of board monitoring. Second, as FIIs can "vote with their feet", firms with higher FIIs' ownership are likely to endorse better board monitoring of firm activities. For example, Leuz et al. (2009) argue that FIIs are likely to leave firms that do not improve their governance. Third, compared to the domestic institutional investors (DIIs), FIIs are less prone to local political pressure in emerging markets, hence they more likely to perform arms-length monitoring (Huang and Zhu, 2015).

[85] See Shleifer and Vishny (1986), Kaplan and Minton (1994), Kang and Shivdasani (1995), Maug (1998), Claessens et al. (2002), and Noe (2002).

[86] Net investment by FIIs in the Indian equity market has grown from INR 440 billion (approximately US$9.6 billion) in 2003-04 to INR 1,102 billion (approximately US$18.01 billion) in 2014-15 (Source: Reserve Bank of India). Also, see "India is the jewel in the emerging market crown", *Financial Times*, May 31, 2015; "Faster growing India confirmed as most dynamic emerging market", *Financial Times*, May 31, 2016.

[87] They find a positive relation of FIIs' ownership with return on assets and net profit margin, whereas they find a negative relation with capital expenditure.

[88] They also find that firms with high FIIs' ownership are more likely to terminate poor performing CEOs and experience improved firm value over time.

For instance, Kim et al. (2016) argue that without political pressure, FIIs are able to resist non-shareholder value-maximizing decisions of the firms.

Fourth, FIIs not only possess a deep understanding of best global corporate governance practices, they also have a wide range of experience in improving the monitoring of the firm (Kim et al., 2016). These knowledge, experiences, and skills set put them in a powerful position to ensure that firms adopt best governance practices, including better board monitoring (Aggarwal et al., 2011). Fifth, FIIs are equipped with innovative investment technology, cutting-edge analytical tools and a pool of talented fund managers that could help them improve the effectiveness and efficiency of board monitoring (Kim et al., 2016). Finally, a large body of empirical studies have agreed that FIIs are at a relative information disadvantage (higher in emerging markets) compared to their domestic counterparts because of distance, language barrier and higher cost of information acquisition (Baik et al., 2013; Coval and Moskowitz, 1999, 2001; Kang and Stulz, 1997; Leuz et al., 2009). This relative disadvantage means FIIs are likely to demand higher information disclosure and higher transparency to ensure that they can function as better board monitors. Given these arguments on how FIIs can influence the effectiveness of board monitoring, we propose the following as our main hypothesis that we examine in third empirical investigation:

Main Hypothesis: Ceteris paribus, firms with greater FIIs' ownership have higher levels of board monitoring.

We test this main hypothesis using seven different proxies reflecting different qualities of board monitoring, which generates seven different sub-hypotheses as discussed below.

4.3.1 FIIs' ownership and board size

Board size refers to the number of directors on the firm's board. The effectiveness of board size in monitoring firms has been theoretically and empirically examined with no conclusive evidence. Agency-theory, based evidence provided by Lipton and Lorsch (1992) and Jensen (1993), argues that smaller boards are more cohesive, more

productive and can monitor the firm more effectively, whereas larger boards may not be effective because of problems such as "social loafing", free-riding and high coordination costs. Yermack (1996) also suggests that the smaller boards are more effective in monitoring and advising. Similarly, Raheja (2005) and Harris and Raviv (2008) theoretically suggest that firms, where insiders' interests align to those of the shareholders, require smaller boards. They argue that larger boards become less effective in providing monitoring services due to free-riding problems. However, the resource dependence-theory, based on evidence provided by Dalton et al. (1999) and Lehn et al. (2009), suggests that larger boards have access to critical resources and possess greater collective information that is important in performing high-quality monitoring and an advising role. Sah and Stiglitz (1991) also suggest that the larger boards can make quality decisions as there are diverse opinions.

Boone et al. (2007) proposes two main hypotheses namely: scope of operation and monitoring hypothesis that determine the size of a board. They argue that the size of the board depends on the scope and complexity of operations of the business. Coles et al. (2008) also find that the complex firms require higher advising needs hence, they demand larger boards. In terms of monitoring, Boone et al. (2007) and Linck et al. (2008) argue that the firm that has higher free-riding problems and information asymmetry tend to have larger boards due to increased monitoring needs. Based on the mixed theoretical predictions and empirical evidence on the optimal size of the board and its effectiveness, the impact of FIIs' ownership on board size also remains an empirical issue. Hence, we develop our first sub-hypotheses as:

Sub-hypothesis 1a: Ceteris paribus, firms with greater FIIs' ownership are more likely to have smaller boards.
Sub-hypothesis 1b: Ceteris paribus, firms with greater FIIs' ownership are more likely to have larger boards.

4.3.2 FIIs' ownership and board independence

Board independence is measured by the proportion of IDs on the firm's board. The role of IDs in monitoring firms has been a topic of intense debate. Conventional wisdom dictates that IDs are effective monitors as they are less influenced by insiders

and managers.[89] Despite governance codes and mandatory rules around the world that push for higher representation of IDs on the board, empirical evidence on its effectiveness is mixed. Theorists observe that although IDs are less affiliated to CEOs, they possess significantly poorer access to firm information and have weaker financial incentives to perform than do corporate officers. Raheja (2005) and Adams and Ferreira (2007) conjecture that the importance of independent boards depends on the nature of the firm. Firms with complex operations require a higher proportion of IDs on the board. Boone et al. (2007) refers to this as "scope of operation" hypothesis. Coles et al. (2008) contend that though "complex" firms require more independent boards due to higher advising needs, R&D intensive firms or high-tech firms require more insiders on the boards as they have vital specific knowledge about the firm and the industry. Interestingly, Linck et al. (2008) find the opposite result, i.e. that R&D intensive firms prefer more independent boards. Likewise, based on Boone et al. (2007)'s "monitoring hypothesis", an optimal board employs large number of IDs when the cost of monitoring is low and private benefits of managers are high. Boone et al. (2007) also argue that CEOs can influence the appointment of IDs by placing affiliated outsiders on the board, referred to as "negotiation hypothesis". Hermalin and Weisbach (1998) also argue that CEOs in profitable companies may use their power to influence the appointment of loyal IDs.

With respect to emerging markets, empirical studies indicate that IDs are generally ineffective board monitors. For example, Ma and Khanna (2015) show that IDs generally defer to the top managers as they feel obliged for having been appointed to a directorship position. As such, despite the theoretical prediction that IDs may improve firm monitoring, FIIs in emerging markets may not be very keen on promoting board independence.

Given the mixed evidence on the link between IDs and firm performance, and the evidence on the ineffectiveness of IDs in emerging markets, the influence of FIIs' ownership on board independence is an empirical question. As such, we develop the following two competing sub-hypotheses:

[89] Fama (1980) argues that IDs have an incentive to be an effective monitor in order to improve their reputational capital in the labour market. Fama and Jensen (1983) argue that IDs are better suited to perform monitoring tasks as they are free from economic interests.

Sub-hypothesis 2a: Ceteris paribus, firms with higher FIIs' ownership are more likely to improve board independence.
Sub-hypothesis 2b: Ceteris paribus, firms with higher FIIs' ownership are more likely to reduce board independence.

4.3.3 FIIs' ownership and board busyness

Board busyness is proxied by the number of members who also serve on the board of other firms (Col and Sen, 2018). Adams et al. (2010) propose a simple theory, which predicts that busier directors put less effort into their duties, which is counterproductive to firms' performance. However, Adams et al. (2010) also suggest busy directors can spend more effort per activity, implying that busy directors are relatively high-quality directors. Consistent with the quality view, earlier studies support that the busy boards are effective (see Booth and Deli, 1996; Ferris et al., 2003; Kaplan and Reishus, 1990). However, other studies find convincing evidence of the negative link between board busyness and firm performance, supporting the *less effort* theory. For example, Fich and Shivdasani (2006) and Falato et al. (2014) show that busy directors are less able to monitor effectively and advise management. Hauser (2018) also argues that the effectiveness of board members (be it insider or independent) depends on their ability to devote substantial effort and time to gather relevant information, provide adequate advising and assist deliberating decisions. Clearly, given the differing evidence on the monitoring ability of busy boards, whether FIIs should strive to reduce or increase the extent of board busyness is an empirical question, as reflected in the following two sub-hypotheses:

Sub-hypothesis 3a: Ceteris paribus, firms with higher FIIs' ownership are more likely to reduce board busyness.
Sub-hypothesis 3b: Ceteris paribus, firms with higher FIIs' ownership are more likely to increase board busyness.

4.3.4 FIIs' ownership and board diligence

Board diligence refers to the ability of board members to fulfill their responsibilities, measured as the average proportion of meetings attended by board members. Kolev et al. (2017) argue that diligent boards can constrain CEOs' opportunism, which depends on the frequency of their attendance at board meetings. Regular attendance at board meetings provides directors with relevant and timely information that helps them to become active monitors. In a similar vein, Hermalin (2005) argues that board diligence improves board monitoring by making CEOs work harder and deliver higher CEO effort. Vafeas (1999) and Adams (2005) view the frequency of board meetings as an important monitoring proxy. They argue that firms with impaired financial performance meet more often as there is a need for increased board monitoring. Similarly, Chou et al. (2013) also find that the attendance at board meetings by the directors themselves, a proxy of better board monitoring, enhances firm value significantly (see Brick and Chidambaran (2010)). Sarkar et al. (2008) suggest that a diligent board reduces earnings management. Also, Col and Sen (2018) report that institutional ownership positively affects board diligence. Vafeas (1999) also finds that the number of board meetings is negatively related to insider ownership. As most literature suggest that diligent boards are an effective monitor, we expect a positive link between FIIs' ownership level and board diligence, as argued in the following hypothesis:

Sub-hypothesis 4: Firms with higher FIIs' ownership are more likely to improve board diligence.

4.3.5 FIIs' ownership and board networks

Board networks, also known as board interlocks, refer to the extent of board members' connections with other firms. This is measured as the number of firms with which the given firm shares common directors. The monitoring ability and effectiveness of boards with many networks, i.e. more interlocked directors, is questionable in the literature. A board network could be beneficial to firms if such a network facilitates information or knowledge transfer. For instance, Lynall et al. (2003) and Khanna and

Thomas (2009) argue that director interlocks could facilitate coordination across firms due to joint resource allocation and information dissemination among them.

However, Fich and White (2003), and Fich and Shivdasani (2006) argue that boards comprised of directors with large outside networks are less likely to perform a better monitoring role and this could potentially reduce the independence of board members and exacerbate agency problems. Firms with higher director network connections are also related to higher CEO compensation and involvement in option backdating, potentially increasing agency problems (Bizjak et al., 2009; Hallock, 1997). Fich and White (2005) also report that board networks, especially CEOs' networks, benefit the directors themselves but not the firm's shareholders.[90] Against the backdrop of conflicting prior evidence, the direction of the effect of FIIs on the board network size is an empirical question. As such, we propose the following two competing sub-hypotheses:

Sub-hypothesis 5a: Ceteris paribus, firms with higher FIIs' ownership are more likely to have smaller board networks.
Sub-hypothesis 5b: Ceteris paribus, firms with higher FIIs' ownership are more likely to have larger board networks.

4.3.6 FIIs' ownership and CEO power

CEO's power refers to the ability of the CEO to influence key decisions in a firm. The ability of the CEO to influence decision making is reduced when there is the presence of other relevant decision-makers. As such, we classify the CEO as powerful if the CEO is the promoter, the chair and the only executive member on the board (Adams et al., 2005). With regard to the effect of powerful CEOs on the board monitoring, agency theory argues that powerful CEOs can influence the effectiveness of outside directors, as they have access to the firm's resources and information (Combs et al., 2007). Hermalin and Weisbach (1998) argue that board monitoring and its efficiency decline over time as the power of the CEO increases. Increased CEO power also

[90] Similarly, Falato et al. (2014) report a significant negative market reaction to an "attention shock" (measured as death of directors and CEOs) in board-interlocked firms. Fich and Shivdasani (2007) also report a valuation loss for interlocked firms at the time of a lawsuit filing.

distorts the compensation contract, reducing the board efficiency (Bebchuk and Fried, 2003; Bebchuk et al., 2002; Ryan and Wiggins, 2004). Further, Onali et al. (2016) state that powerful CEOs may invest in non-value maximizing projects to fulfill their own managerial objectives, such as increasing perquisites, empire-building and expense preference behavior. In terms of its effectiveness, CEO power is found to be positively associated with increased cost of debt, increase level of executive compensation, lower accounting profitability and lower (negative) acquisition announcement returns (Adams et al., 2005; Bebchuk et al., 2011; Liu and Jiraporn, 2010; Jiraporn et al. 2012). Given the negative impact of CEO power on the board monitoring, as well as its effectiveness in terms of firm performance, we expect higher FIIs' ownership to lower the power of the CEO as reflected in the following sub-hypothesis:

Sub-hypothesis 6: The higher the FIIs' ownership in the firm, the less powerful the CEO is.

4.3.7 FIIs' ownership and CEO pay

CEO pay denotes the total remuneration (such as salaries, bonuses, fees, and other benefits) received by the CEO in a year. Agency theory suggests that compensation is a primary tool to control CEO behavior and align the interest of shareholders and managers, thereby reducing agency costs (Jensen and Meckling, 1976; Nyberg and Fulmer, 2010). However, empirical evidence questions the validity of agency theory on the alignment of financial interest and managerial preferences (Dalton et al., 2007). Studies argue that CEOs are in fact paid for luck and performance beyond their control, and this behavior is strongest among poorly governed firms (Bertrand and Mullainathan (2001). Empirical evidence also suggests that CEOs are overpaid and these overcompensated CEOs exacerbate the agency problems as they are not focused on protecting shareholders' interests (Core et al., 1999; Dah and Frye, 2017). The evidence in relation to the effectiveness of CEO pay is also mixed. While Chang et al. (2010) argue that CEO pay reflects the ability of the CEO to positively affect firm performance, Brick et al. (2006) find that cronyism exists in determining the CEO compensation and such excess compensation leads to poor firm performance (also see Core et al., 1999). As the literature provides mixed evidence on the effect of CEO pay

on board monitoring, we empirically examine whether FIIs reduce or increase the compensation of CEOs. Hence, our final sub-hypotheses are:

Sub-hypothesis 7a: Ceteris paribus, firms with higher FIIs' ownership are likely to have lower levels of CEO pay.
Sub-hypothesis 7b: Ceteris paribus, firms with higher FIIs' ownership are likely to have higher levels of CEO pay.

4.4 Data, variables, and identification strategy

4.4.1 Data sources

We retrieve information for all the publicly listed companies in India (both in the National Stock Exchange (NSE) and Bombay Stock Exchange (BSE)). Dooley and Hutchinson (2009) argue that the global financial crisis in emerging markets began towards the end of 2008, hence, we assign the onset of the crisis period from 2009. We restrict our sample to four years before (2005 to 2008) and four years after (2009 to 2012) the onset of the crisis period, i.e. eight fiscal years in total.[91] The firm-year level data are gathered from the Prowess database maintained by the Centre for Monitoring Indian Economy (CMIE). Prowess is a leading data source[92] providing detailed information on the ownership structure and other financial (stock market and non-market based) information of Indian firms. Prowess also supplies comprehensive data on board members of each firm-year, such as name of the board members, committees they sit in, their designation (such as CEO, Managing Director), number of meetings attended, classification (such as promoter/non-promoter, executive/non-executive, independent/non-independent), salary and benefits, and directorships held in a number of other companies. Information on board meetings, along with its date and purpose, can also be accessed from Prowess. These details help us to develop our various board monitoring proxies, which are discussed in the following section. Appendix 4-1 provides a definition of all the variables used in this study, which we discuss below.

[91] In India, the fiscal year ends on the 31st of March of the subsequent year.
[92] This data source has been used by a number of studies, including Lilienfeld-Toal et al. (2012), Vig (2013), Gopalan et al. (2016) and Koirala et al. (2018).

4.4.2 Variable construction

4.4.2.1 Board monitoring variables

We define *Board size* as the log value of the number of board members. *Board independence* is defined as the ratio of the number of IDs to the board size.[93] Next, we also identify the characteristics of board members. *Board busyness* is defined as the log of the number of directors who also serve on the board of another firm (Col and Sen, 2018). We also consider alternative definitions of *Board busyness* following Core et al. (1999) and Fich and Shivdasani (2006). Core et al. (1999) define boards as busy if the majority of members hold three, or more than three, board appointments in another firm. Fich and Shivdasani (2006) define boards as an externally busy board if the majority of IDs serve on three or more other corporate boards. Following Col and Sen (2018), we define *Board diligence* as the mean value, across all board members, of the ratio of meetings attended to the total meetings held in a year. Similarly, *Network size* is defined as the number of other firms with whom the given firm shares common directors, following Helmers et al. (2017). *CEO power* is a binary variable that takes the value of 1 if the CEO is powerful and 0 otherwise. A powerful CEO is defined as one who is the chair, promoter and only executive member of the board (Adams et al., 2005; Cheng, 2008). We use an *Alternate CEO power,* defined as the one who is both the chair of the board and the promoter of the firm. Finally, *CEO pay* is the log of total compensation (sitting fees, salaries, contributions to provident fund, pension fund, bonus and commission, perquisites, and retirement benefits). We use *CEO variable pay* as an alternative definition for CEO pay. *CEO variable pay* is defined as the ratio of CEO variable pay, total compensation except for salaries, to total compensation (Banerjee and Homroy, 2018).

4.4.2.2 Control variables

Following the literature, we also include a set of control variables which could potentially be correlated with board monitoring. First, we control for factors that account for a firm's monitoring costs (Boone et al., 2007; Guest, 2008; Linck et al.,

[93] The Prowess database provides details of the classification of each board member. Such classification is disclosed in the annual reports of the company. If not, Prowess follows Clause 49 of the Securities Exchange Board of India (SEBI) guidelines to classify the directors (Col and Sen, 2018).

2008). The costs of monitoring increase with the specific monitoring requirements of firms. We use *Tobin's Q*, research and development expenses (*R&D*) and stock return variance (*STDDEV*) to proxy the firm's monitoring costs. *Tobin's Q* is defined as the ratio of the sum of the book value of debt, book value of preferred stock and market value of the stock to the book value of assets (Dharmapala and Khanna, 2012).[94] *Tobin's Q* reflects past performance, including growth prospects of the firm. *R&D* is defined as the total R&D expenses scaled by the total sales (missing R&D expenses are 0).[95] *STDDEV* is the one-month standard deviation of daily stock return. Following the literature, we expect *Tobin's Q, R&D* and *STDDEV* to have a negative effect on board size, board independence, board busyness, network size, CEO power and pay, but a positive effect on board diligence.

Second, we control for factors that account for firm's complexity and scope of operation (Baker and Gompers, 2003; Boone et al., 2007; Guest, 2008; Linck et al., 2008). We proxy firm's complexity and scope of operation using *Firm size*, *Leverage* and *Firm age*. We use *Firm size* as the log of total assets, *Leverage* as the ratio of total debt to the shareholders' equity capital, and *Firm age* as the log of difference between the incorporation year and fiscal year. We expect *Firm size*, *Leverage* and *Firm age* to negatively affect board monitoring as larger and complex firms have greater agency problems (Boone et al., 2007).[96] Finally, we also include return on assets (*ROA*), defined as the net income divided by total assets, to control for the impact of firm's profitability on the board monitoring (Banerjee and Homroy, 2018; Cheng, 2008; Eisenberg et al., 1998). In Appendix 4-2, we present the correlation matrix. We do not find evidence of multicollinearity problem. We also calculate the Variance Inflation Factor (VIF) for all regressions and find that VIF range from 1.03 to 1.97 suggesting that the models do not suffer from severe multicollinearity problem.

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[94] The book value of debt and book value of preferred stock is proxied using the Prowess variable "debt". The market value of stock is calculated as the 365-day average of the daily stock price multiplied by the number of shares outstanding at the end of each fiscal year.

[95] As Koh and Reeb (2015) suggest that show that empirical research must consider how R&D reporting may influence the results, we use several approaches in addition to replacing missing R&D with 0. First, we replace missing R&D with industry average. Second, we use additional dummy variable for missing R&D regardless whether we replace missing R&D with industry average or zero. Our main findings are qualitatively similar. The result is available upon request.

[96] Leverage also proxies for change in a firm's capital structure and default risk.

4.4.2.3 Summary figures

Table 4-1 presents the firm-year descriptive statistics of the main variables, along with firm performance, innovation and other financial variables which we compare to other relevant Indian studies. All the potentially unbounded variables are winsorized at the 1% extreme. The monetary variables are denoted in million rupees (INR Million). Panel A shows the average board is comprised of around 9.3 members, which is similar to the 9.9 members reported by Banerjee and Homroy (2018). Given the enforcement of a mandatory reform in the year 2000, named Clause 49, we expect the average board independence to be close to 50%.[97] Banerjee and Homroy (2018) report an average board independence of around 51%, and we find an average board independence of around 47%. The summary figures further show that around 5.25 board members (almost 57% of the mean board size) serve on the board of another firm. On average, a board is connected to 25 other firms, as suggested by the mean *Network size.* The *CEO power* is relatively high at 0.16 in India, compared to 0.09 reported by Cheng (2008) for the US, and the mean CEO pay is around INR 6.67 million, which is higher than the INR 4.63 million reported by Banerjee and Homroy (2018).

Panel B shows the FIIs' average ownership of around 11.62% and DIIs' average ownership of around 28.54%. Panel C shows that the average *ROA* of firms in our sample is 3.57%, *Tobin's Q* is approximately 1, and *EPS* is 8.1 *ROA* in our sample is similar to that of Srinivasan and Thampy (2017), and the values of *Tobin's Q* and *EPS* are similar to Dharmapala and Khanna (2012), Helmers et al. (2017), and Banerjee and Homroy (2018). Finally, Panel D shows that the firms in our sample have a mean asset size of INR 4,159 million, sales revenue of INR 4,721 million, average age of 33 years and leverage of 125. Overall, our descriptive results are similar to other Indian studies, (Vig, 2013).

[97] Clause 49 of SEBI requires all the firms to have at least one-third of the members of board to be independent if the Chair is a non-executive director and have at least half of the members to be independent if the Chair is an executive director.

Table 4-1: Summary Statistics

This table provides the summary statistics of all the variables in our full sample. The sample period is 2005-2012. Variables are described in Appendix 4-1.

	Mean	Median	Std. Dev.	10pct	90pct
Panel A: Board monitoring					
Board size (#)	9.26	9.00	3.09	6.00	13.00
Board independence (%)	47.34	46.67	13.86	30.00	66.67
Board busyness	5.25	5.00	3.10	1.00	9.00
Board diligence	0.63	0.63	0.20	0.36	0.91
Network size (#)	25.10	20.00	22.80	1.00	55.00
CEO power	0.16	1.00	0.25	0.00	1.00
CEO pay (INR Million)	6.67	3.30	10.05	0.64	16.13
Panel B: Ownership variables					
FIIs' ownership (%)	11.62	3.29	16.31	0.05	36.49
DIIs' ownership (%)	28.54	12.98	35.13	0.17	82.17
Panel C: Firm performance variables					
Return on assets (%)	3.57	3.32	6.20	-4.37	12.04
Tobin's Q	0.95	0.79	0.54	0.45	1.75
Earnings per share (EPS)	8.10	3.42	41.47	-4.80	24.37
PBDITA (INR Million)	525.61	195.80	767.22	9.30	1,588.70
Assets turnover ratio (Times)	0.99	0.92	0.63	0.19	1.92
Panel D: Financial variables					
Firm size (INR Million)	4,158.76	1,883.30	5,544.57	330.20	11,276.80
Firm age (Years)	33.19	26.00	19.77	15.00	62.00
Leverage (%)	125.36	79.73	136.64	0.87	324.68
STDDEV (%)	17.96	16.63	8.47	9.25	27.76
Sales (INR Million)	4,721.50	1,712.40	9,282.25	143.00	11,310.80
Export (% of Sales)	15.58	3.25	24.51	0.00	53.50
Capital expenses (INR Million)	532.69	125.20	1,312.43	8.50	1,415.30
R&D expenses (INR Million)	8.13	0.00	25.75	0.00	20.60

4.4.3 Exogenous shocks and identification strategy

We use the 2007-2008 financial crisis as an exogenous shock as it provides an unexpected time-series variation in FIIs' ownership. Although the financial crisis begins towards the end of 2007 in developed markets, Dooley and Hutchinson (2009) show that the effect of the crisis is only observed in emerging markets towards the end of 2008. As such, we assign the onset of the crisis period from 2009. Further, the period of decline is short-lived, around four years on average, as the capital flows bounces back and rises to levels only moderately below those observed before the crisis (see Milesi-Ferretti et al., 2011). Therefore, we focus our empirical analysis on four years

before (2005-2008) and four years after (2009-2012) the onset of the crisis.

We follow Patnaik and Shah (2013) and rescale the FIIs' and DIIs' ownership based on the number of freely floated shares. For example, if the promoter ownership in a firm is 50% and FIIs' ownership is 25%, we rescale FIIs' ownership to 50% as they own a half of the freely floated shares in the public market. Figure 4-1 shows the average FIIs' ownership and change in FIIs' ownership. The share of FIIs' ownership declines sharply after the crisis period from around 16.3% in 2008 to 14.4% in 2009 (a proportionate decline of approximately 13.2%). This sudden and unexpected decline provides us an ideal identification set-up to test the implications of this decline on the different characteristics of board monitoring/effectiveness.

Although the shock is exogenous, we need two groups of firms that should be highly comparable. We construct the treatment and control group firms following Patnaik and Shah (2013) who find significant differences between FIIs' and DIIs' firm preferences along certain dimensions of firm characteristics in the Indian market. For instance, they find that FIIs favor younger, larger, lower risk, higher beta, more R&D intensive firms that have smaller inside ownership. In comparison, DIIs favor older, smaller, less liquid, and less R&D intensive firms. Motivated by this uniqueness in the firm preferences of FIIs and DIIs, we construct our treatment and control groups in the following manner.

First, we calculate the mean ownership by FIIs and DIIs for each firm before 2008 (starting in 2002).[98] Then, we identify "High FIIs" firms as those in which FIIs' ownership is above the firm-year median FIIs' ownership and "High DIIs" firms as the one in which DIIs' ownership is above the median DIIs' ownership. Next, we drop firms who are categorized as both "High FIIs" and "High DIIs".[99] Thus, the remaining "High FIIs" firms are categorized as *treatment* firms and the remaining "High DIIs" firms are categorized as *control* firms. The treatment firms are essentially a set of firms that are chosen by FIIs for investment but generally ignored by DIIs, and the control

[98] Prowess provides ownership data with its classification starting in 2002.

[99] Since our distinction is based on the FIIs' and DIIs' ownership level, we need to drop these firms as the effect of the FIIs on board monitoring will not be cleanly identified in the firms where we observe the presence of both high FIIs' and high DIIs' ownership.

firms are chosen for investment by DIIs but have low FIIs' investments. We also identify alternate control firms as "None", where neither FIIs nor DIIs have high equity ownership.

Figure 4-1: Average FII's ownership

This figure plots the average FIIs' ownership (y-axis) in figure (a) and change in FIIs' ownership (y-axis) in figure (b) four years (x-axis) before and after the financial crisis (dash vertical line). The shaded area in figure (a) shows the 95% confidence interval.

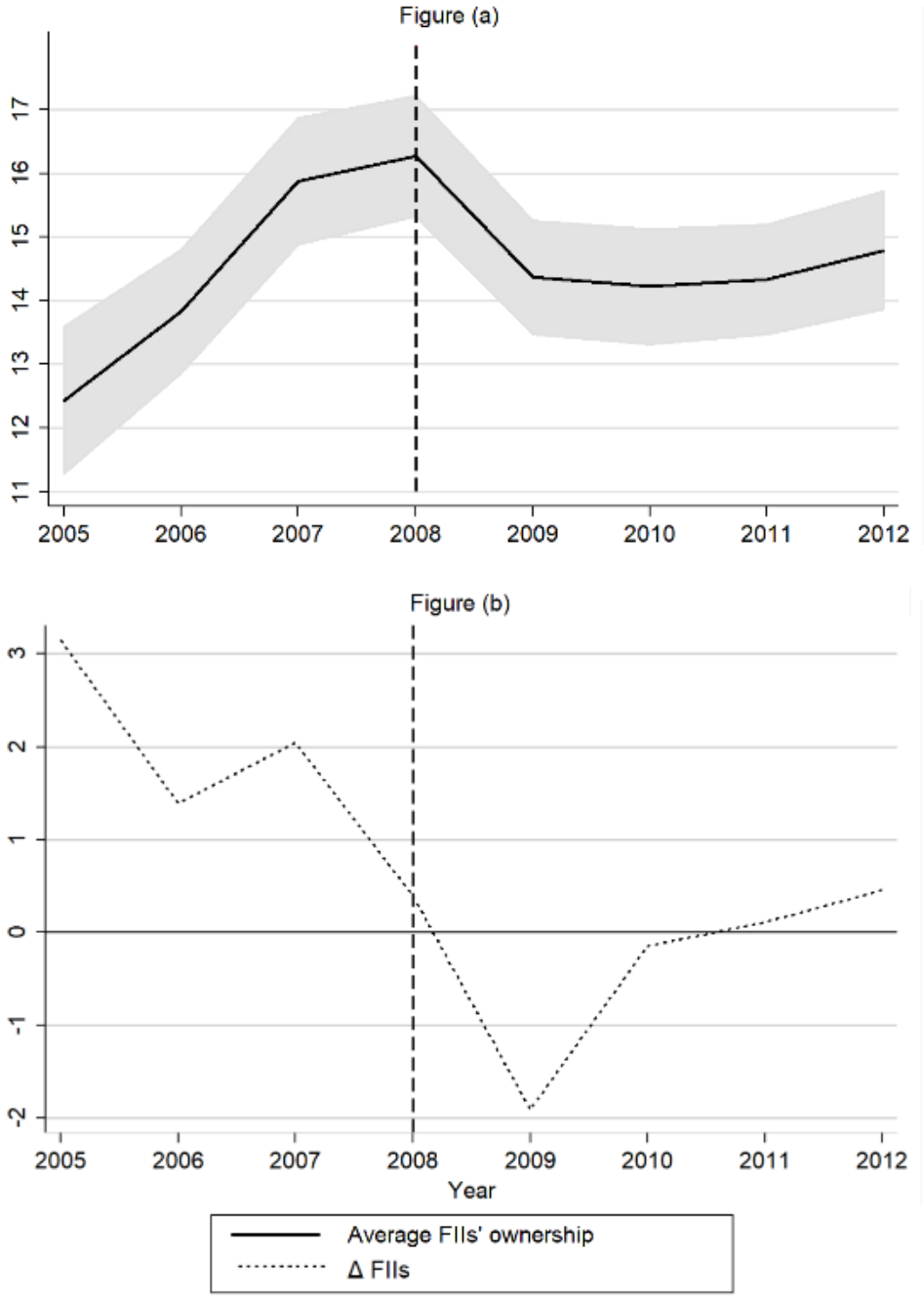


Table 4-2: Sample selection

The table shows the sample selection process. The sample firms are identified based on FIIs' and DIIs' ownership before 2008.

Filter	Number of firms
Number of firms in the universe with FIIs' and DIIs' ownership	4,842
Number of firms classified as "High FIIs"	2,932
Number of firms classified as "High DIIs"	2,102
Number of firms classified as "None"	1,469
Less: Number of firms classified as both "High FIIs" and "High DIIs"	1,861
Number of firms classified as "High FIIs" but no "High DIIs"	689
Number of firms classified as "High DIIs" but no "High FIIs"	823
Number of firms classified as "None"	1,469

Table 4-2 shows our sample selection. Out of 4,842 firms in the universe, we identify 2,932 firms as "High FIIs firms" and 2,102 firms as "High DIIs firms". We also identify 1,469 firms in the "None" category. After dropping firms with "High FIIs" and "High DIIs", we are left with 689 firms with high FIIs' ownership and low DIIs' ownership, and 823 firms with high DIIs' ownership and low FIIs' ownership.

To eliminate the concern that the differential impact of FIIs on board monitoring may be due to the differential firm preferences, we perform propensity score matching (PSM) to identify a matched set of treatment and control firms. To do so, we first estimate the probit model in which the dependent variable is equal to one if the firms belong to the treatment group and zero otherwise. We use various firm-level characteristics, such as Tobin's Q, Firm Size, Firm Age, ROA and Leverage (following Col and Sen, 2018). In keeping with the literature, we expect that firms with higher FIIs' ownership have higher values, are larger in size, are younger in age, have a higher ROA and have low leverage (Douma et al., 2006; Ferreira and Matos, 2008; Patnaik and Shah, 2013). These variables are included to help satisfy the parallel trend assumptions as there should not be any firm-specific differences in characteristics between the treatment and the control group prior to the crisis that attracts FIIs.

Model 1 of Table 4-3 (Panel A) presents the probit model estimates with industry fixed effects and standard error clustered at the industry level. The

specification shows some of the independent variables are statistically significant, suggesting significant variation in firms' characteristics between the treatment and the control group. We then use the propensity scores from Model 1 to perform nearest-neighbor PSM within a 0.01 caliper and end up with 390 unique pairs of matched firms.

Table 4-3: Propensity score matching

The table reports the results of PSM. Treatment group is defined as the firms with "High FIIs" whereas Control group is defined as the firms with "High DIIs". "High FIIs" firms are those in which FIIs' ownership is above the median FIIs' ownership and "High DIIs" firms are those in which DIIs' ownership is above the median DIIs' ownership before 2008. We use PSM with the nearest neighborhood of 0.01 caliper using various firm-level characteristics to identify matched control groups. Panel A presents the parameter estimates from the probit model used to estimate the propensity scores for the treatment and control groups. The dependent variable is 1 if in the treatment group and 0 if in the control group. The firm-level characteristics are defined in Appendix 4-1. We control for firm fixed effects. Standard errors are corrected for clustering at the firm level. Panel B reports the distribution of estimated propensity scores post matching. Panel C reports the average treatment effect on treated (ATT), its corresponding *t*-statistics, the average treatment effect (ATE) and % of bias reduced after matching. Panel D reports regression results based on Equation (4-1). The dependent variable is various proxies of board monitoring: board size, board independence, board busyness, board diligence, network size, CEO power and CEO pay. $Treated_i$ is the dummy variable that takes the value of one if the firm is classified as a treated firm and zero if firms are classified as control firms. $Year_{05-06}$, $Year_{07}$, $Year_{08}$, $Year_{09}$, $Year_{10}$, and $Year_{11-12}$ indicate firm-year observations. Firm and time fixed effects are included, and errors are clustered at firm level. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

Panel A: Pre-match propensity score regression and post-match diagnostic regression

	Dummy=1 if in the treatment group; 0 if in the control group	
	Model 1 Pre-match	Model 2 Post-Match
Firm size	0.672***	-0.220
	(3.25)	(-1.58)
Tobin's Q	0.170**	0.112
	(2.32)	(0.86)
Firm age	-0.183***	-0.121
	(-2.59)	(-1.61)
Return on assets	0.426	0.601
	(0.97)	(1.39)
Leverage	-0.000	-0.000
	(-1.21)	(-1.14)
Pseudo R^2	0.372	0.214
Number of observations	6,111	4,263

Panel B: Estimated propensity score distributions

	Firms	Min.	5pct	Median	Mean	Std. Dev	95pct	Max
Treatment	390	0.004	0.188	0.565	0.563	0.214	0.904	0.984
Control	390	0.004	0.188	0.574	0.569	0.218	0.914	0.994
Difference	-	0.000	0.000	-0.009	-0.006	-0.004	-0.010	-0.010

Table 4-3: Continued

Panel C: Difference in firm characteristics

	Treatment	Control	ATT	*t*-statistics	ATE	% bias reduced
Firm size	7.704	7.284	0.420	0.47	-0.009	86.4%
Tobin's Q	0.887	0.938	-0.051	-0.99	-0.060	20.0%
Firm age	3.158	3.138	0.020	0.77	0.006	78.7%
Return on assets	0.029	0.034	-0.005	-1.55	-0.006	57.6%
Leverage	3.513	2.462	1.051	0.94	0.695	68.9%

Panel D: Parallel trends

	Board size (1)	Board independence (2)	Board busyness (3)	Board diligence (4)	Network size (5)	CEO power (6)	CEO pay (7)
$Treated_i \times Year_{05-06}$	0.017	-0.003	0.020	-0.019	0.749	-0.023	0.096
	(1.25)	(-0.61)	(0.59)	(-1.26)	(1.80)	(-0.70)	(1.24)
$Treated_i \times Year_{07}$	0.029	-0.015	0.059	0.040	0.830	-0.020	0.113
	(1.05)	(0.17)	(0.69)	(1.42)	(0.87)	(-0.91)	(1.54)
$Treated_i \times Year_{08}$	0.019	-0.009	0.010	0.066	1.377*	-0.015	0.175
	(1.09)	(0.00)	(1.34)	(1.07)	(1.87)	(-1.13)	(1.29)
$Treated_i \times Year_{09}$	0.055**	0.012**	0.098**	-0.046***	2.198***	0.056**	0.263***
	(2.52)	(2.14)	(2.02)	(-3.79)	(3.06)	(2.41)	(4.35)
$Treated_i \times Year_{09}$	0.058**	0.021**	0.096**	-0.051***	4.353***	0.053**	0.377***
	(2.62)	(2.35)	(2.46)	(-2.74)	(3.35)	(2.22)	(4.29)
$Treated_i \times Year_{11-12}$	0.062**	0.029***	0.108**	-0.062***	5.885***	0.051***	0.434***
	(2.49)	(3.02)	(2.33)	(-3.34)	(3.11)	(3.70)	(2.92)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.30	0.08	0.23	0.27	0.26	0.07	0.44
Number of observations	4,390	4,253	4,001	4,250	4,414	4,390	3,308

We conduct a few diagnostic tests to verify our matching process. First, we rerun the probit model with the matched sample of firms and find that none of the independent variables is statistically significant (as shown in Model 2 of Table 4-3 Panel A). This suggests that there is no observable difference in firm characteristics between the treatment and the control group. Second, we examine the difference between the propensity scores of the treated group firms and those of the matched control group firms. Panel B of Table 4-3 shows a very small difference in the propensity scores. Finally, we report the average treatment effect on the treated (ATT), average treatment effect (ATE), and percent of bias reduced for firms' characteristics in Panel C of Table 4-3. This shows that none of the ATT is significant and there is a significant amount. Overall, the diagnostic tests show that our approach of using the PSM process removes meaningful observable differences between firms with high FIIs' ownership and firms with high DIIs' ownership.

To examine the parallel trend, we follow Bertrand and Mullainathan (2003) and examine how the board monitoring changes over time. Specifically, we run following regression equation:

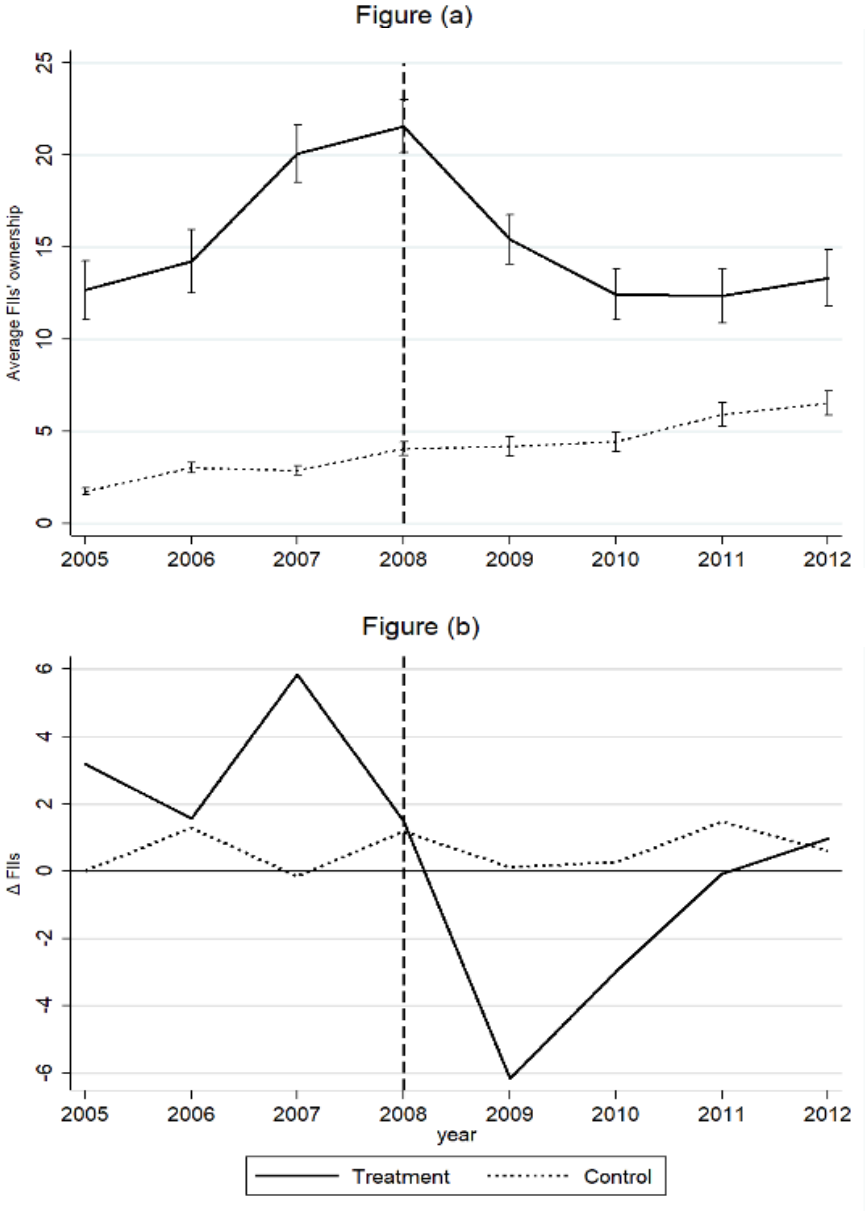
$$\begin{aligned} y_{it} = {} & \beta_1 Treated_i \times Year_{05-06} + \beta_2 Treated_i \times Year_{07} \\ & + \beta_3 Treated_i \times Year_{08} + \beta_4 Treated_i \times Year_{09} \\ & + \beta_5 Treated_i \times Year_{10} + \beta_6 Treated_i \times Year_{11-12} + \gamma_t + \alpha_i \\ & + \varepsilon_{it} \end{aligned} \tag{4-1}$$

where i indexes firms, t indexes time; y_{ijt} is the dependent variable of interest, which is the different proxies of board monitoring; γ_t and α_i are year and firm fixed effects respectively. $Treated_i$ is the dummy variable that takes the value of one if the firm is classified as a treated firm and zero if firms are classified as control firms. $Year_{05-06}$, $Year_{07}$, $Year_{08}$, $Year_{09}$, $Year_{10}$, and $Year_{11-12}$ indicate firm-year observations. For example, $Year_{05-06}$ is a dummy variable that takes value of 1 if a firm-year observation is from year 2005 or 2006. The results are presented in Panel D. The coefficient estimates on β_1, β_2, and β_3 are all insignificant. In contrast, the coefficient of β_4, β_5 and β_6 are all significant at either 1% or at 5% level. The difference in the significance of the before and after dummies show that there is an existence of parallel trend in the board monitoring between the treatment and control group prior to the crisis period. Further, it also highlights that the results are not driven by the reverse

causality and the change in board monitoring is casually affected by the change in level of FIIs' ownership due to the crisis.

Figure 4-2: Average FIIs' ownership of treatment and control group

This figure shows the trend in the average FIIs' ownership (y-axis) in figure (a) and trend in the change in FIIs' ownership (y-axis) in figure (b) for the firms in the treatment group (solid black line) and the firms in the control group (dot black line), four years (x-axis) before and after the crisis (dash vertical line). Treatment group is defined as the firms with "High FIIs" whereas Control group is defined as the firms with "High DIIs". "High FIIs" firms are those in which FIIs' ownership is above the median and "High DIIs" firms are those in which DIIs' ownership is above the median before 2008. Two standard errors are represented by the vertical lines in figure (a) from each of the annual mean nodes.



We also plot the average FIIs' ownership for the treatment and the control groups in Figure 4-2.[100] The average FIIs' ownership increases in both the treatment and the control group prior to the crisis. However, the FIIs' ownership declines sharply from around 21.6% in 2008 to 15.4% in 2009 (a decline of 6.2% points) and decreases further to 13.3% in 2012 for the firms in the treatment group. In contrast, the average FIIs' ownership for the control group remains relatively similar at 4.1% in 2008 to 4.2% in 2009 and increases to 6.5% in 2012. The key takeaway from this figure is that compared to the virtual parallel trend observed between treatment and control groups before the end of 2009, the treated group firms' FIIs' ownership significantly declines compared to that of control group firms. In the following sections, we examine the effect of this unexpected and non-parallel change on various board level characteristics.

4.4.4 Post-crisis and pre-crisis summary figures

We conduct a univariate analysis comparing the firm-year summary statistics of the board and other firm-level characteristics before and after the crisis of 2008. The results of mean and median for the pre- (2005-2008) and the post-crisis (2009-2012) period are shown in panels A and B of Table 4-4 respectively. Table 4-4 shows that compared to pre-crisis, firms in the post-crisis period are larger in their board size and exhibit greater board independence. Board busyness also increases significantly following the crisis based on all definitions. However, relative to the pre-crisis period, board diligence seems to be worse and firms have a greater network connection in the post-crisis period. In summary, the general view from these results signals that the quality of board monitoring, except for board independence, seems to have fallen significantly in the post-crisis period compared to pre-crisis.[101]

[100] By definition, the treatment group comprises firms with high FIIs' ownership but low DIIs' ownership, and the average FIIs' ownership is higher for the treatment group compared to the control group. Our objective here is to examine the trend in FIIs' ownership, rather than the level of FIIs' ownership.

[101] The reason for change in board structure may be debatable. The advising needs of firms may have increased following the financial crisis and economic uncertainty that may have prompted the change in board structure. On the other hand, lack of monitors who could scrutinize board activities may also prompt the change in board structure.

Table 4-4: Pre and post summary figures

This table compares the important variables before and after the financial crisis. Panel A shows the comparison of means and the Panel B shows the comparison of medians. The significance of the mean and median is based on a two-tailed *t*-test and Wilcoxon test respectively. *, **, and *** denote significance at the 10%, 5% and 1% significance level respectively.

	Panel A: Means			Panel B: Medians		
	Pre-crisis (1)	Post-crisis (2)	Diff (2)-(1)	Pre-crisis (1)	Post-crisis (2)	Diff (2)-(1)
Board size (#)	8.97	9.55	0.58***	9.00	9.00	0.00
Board independence (%)	45.83	48.83	3.00***	44.44	50.00	5.56***
Board busyness	4.96	5.58	0.62***	5.00	5.00	0.00
Board diligence	0.67	0.59	-0.08**	0.64	0.62	-0.02**
Network size (#)	23.98	26.21	2.23***	19.00	21.00	2.00***
CEO power	0.14	0.18	0.04	0.00	0.00	0.00
CEO pay	5.27	8.07	2.80***	3.06	4.15	1.09***
Return on assets (%)	4.33	3.00	-1.33***	4.25	2.86	-1.39***
Tobin's Q	1.01	0.90	-0.11***	0.90	0.76	-0.14***
Earnings per share	8.56	7.64	-0.92	4.23	2.88	-1.35***
PBDITA (mln)	605.22	445.99	-159.23***	232.40	182.90	-49.50***
Assets turnover (Times)	1.03	0.96	-0.07***	0.93	0.87	-0.06***
R&D expenses (Million)	9.97	6.31	-3.66***	0.00	0.00	0.00
Patent count (#)	0.09	0.04	-0.05**	0.00	0.00	0.00
Total assets (mln)	4,033.38	4,284.11	250.73***	1,633.10	2,388.40	755.30***
Age (Years)	31.19	35.19	4.00***	24.00	27.00	3.00**
Leverage (%)	123.56	127.20	3.64	83.23	76.75	-6.48**
STDDEV (%)	19.49	16.42	-3.07***	17.93	16.48	-1.45***
Sales (mln)	3,646.05	5,793.96	2147.91***	1,542.05	2,006.45	464.40***
Export (% of sales)	16.02	15.14	-0.88	3.45	3.07	-0.38**
Capital expenses (mln)	621.50	443.85	-177.65***	111.85	128.90	17.05**

The performance of the firms after the crisis in terms of *ROA*, *Tobin's Q*, *EPS*, *PBDITA* and *Asset turnover ratio* all decline significantly, which is expected given the impact of the crisis. However, the size of the firms in terms of assets and sales revenue increases significantly following the crisis. Variables related to firm innovation, i.e. average *Patent count* and *R&D* reduce significantly following the crisis period, again consistent with the impact of a financial shock.

4.5 Empirical analysis

We begin our empirical investigation with a baseline difference-in-differences (DiD) regression followed by propensity score matched DiD regression. We also perform robustness tests on our main results followed by the examination of the implications of board monitoring by FIIs.

4.5.1 Univariate difference-in-differences results

In Panel A of Table 4-5, we first present the summary figures for the changes in FIIs' ownership. Columns (2) and (3) report the average change in FIIs' ownership post and pre-crisis period, (i.e. post – pre) for the treatment firms and control firms respectively. Column (4) reports the mean DiD estimation, which is the difference in FIIs' ownership between the treatment firms and control firms post and pre-crisis period. Corresponding *t*-statistics testing the null hypothesis that the DiD estimators are zero are presented in parentheses.

The FIIs' ownership for the treatment group decreases significantly post-crisis, whereas, the FIIs' ownership for the control group increases, but not significantly, post-crisis. There is also a significant decline in change in FIIs' ownership post-crisis for the treatment group compared to control group. The magnitude of the DiD estimator suggests that, on average, the exogenous shock leads to significant decrease in FIIs' ownership of about 5.1% in the four-year period post-crisis relative to the four-year period pre-crisis for the treatment firms than for the control firms. The mean DiD for the changes in FIIs' ownership is also statistically significant at -1.4% points.

The results in the Panel B of Table 4-5 show a significant increase in the board size of treated firms (firms with high FIIs' ownership) in the post-crisis period compared to the control firms, which is not statistically significant. Importantly, the mean DiD estimation is statistically significant. Since the increase in board size is associated with a decline in FIIs' ownership in the post-crisis period, the result suggests that a decline in FIIs could have triggered larger boards in the post-crisis period compared to smaller boards in the pre-crisis period.

We find the average value of the board independence of the treated firms increases significantly in the post-crisis period compared to the control firms. This indicates that FIIs' decline in ownership is associated with an increase in the regulatory defined, higher board independence. This could indicate that board independence is not as significant to FIIs as may have been expected. We interpret this result cautiously as there is credible evidence to suggest that incumbent managers in emerging markets can appoint directors who are independent according to regulatory definitions, but nonetheless can still be sympathetic to management (Cohen et al., 2012a; Romano,

2005). This implies that the less pressure from FIIs in the post-crisis period could have motivated managers to increase the so-called regulatory defined IDs, but they may not be very effective in monitoring, but sympathetic to the managerial decisions.

Table 4-5: Mean difference-in-differences analysis

This table reports the mean DiD test results examining the mean difference in FIIs' ownership in Panel A and board monitoring proxies in Panel B pre (2005-2008) and post-crisis period (2009-2012) for the treatment and control group. The main variables are defined in Appendix 4-1. Treatment group is defined as the firms with "High FIIs" whereas Control group is defined as the firms with "High DIIs". "High FIIs" firms are those in which FIIs' ownership is above the median FIIs' ownership and "High DIIs" firms are those in which DIIs' ownership is above the median DIIs' ownership before 2008. We use PSM with the nearest neighborhood of 0.01 caliper using various firm-level characteristics to identify matched control groups. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

Panel A: Ownership

	Mean treatment difference (post – pre)	Mean control difference (post – pre)	Mean DiD estimator (treat-control)
FIIs' ownership	-4.628***	0.820	-5.088***
	(-4.17)	(1.31)	(-4.87)
Δ FIIs (% points)	-1.590***	-0.163	-1.427***
	(-3.26)	(-1.40)	(-4.05)

Panel B: Board monitoring proxies

	Mean treatment difference (after-before)	Mean control difference (after-before)	Mean DiD estimator (treat-control)
Board size	0.074***	0.003	0.071***
	(3.42)	(0.83)	(3.12)
Board independence	0.041***	0.006	0.035**
	(2.98)	(0.95)	(2.43)
Board busyness	0.126***	0.017	0.109**
	(2.86)	(0.59)	(2.47)
Board diligence	-0.051***	-0.007	-0.044***
	(-3.43)	(-1.21)	(-3.21)
Network size	5.020**	0.080	4.940**
	(2.18)	(0.23)	(2.15)
CEO power	0.026**	-0.023	0.049**
	(2.27)	(-1.31)	(-2.43)
CEO pay	0.524***	0.239**	0.285***
	(5.39)	(2.35)	(2.89)

The mean DiD estimate for board busyness is significantly positive, indicating higher FIIs' ownership is associated with lower board busyness in the pre-crisis period, i.e. higher presence of FIIs seems to lessen board busyness, thereby potentially

improving its effectiveness. The DiD for board diligence is significantly negative, indicating a significant decline in board diligence following the reduction in FIIs' ownership during the post-crisis period. This suggests that higher FIIs' ownership implies higher board diligence.

The network size is higher for the treated firms, compared to the control firms, in the post-crisis period when FIIs' ownership falls. This supports the conjecture that a higher level of FIIs' ownership appears to lower the network size of the board to render it more effective. Similarly, the power and pay of the CEO increase significantly for the treated firms compared to our control firms. This suggests that the CEO's influence significantly increases with the decline of FIIs' ownership, potentially driven by lower pressure from influential outside investors such as FIIs.

Taken together, these DiD univariate results provide an initial indication that firms with high FIIs' ownership have better board monitoring compared to firms with high DIIs' ownership.

4.5.2 Effect of FIIs' ownership on board monitoring: propensity score matched DiD result

In the multivariate regression framework, we control for several variables that are understood to affect the various board monitoring measures. Specifically, we investigate the following regression model:

$$y_{it} = \beta\, Treated_i \times Crisis_t + X_{it} + \gamma_t + \alpha_i + \varepsilon_{it} \qquad (4\text{-}2)$$

where $Crisis_t$ is also a dummy variable that takes the value of one in the post-crisis years (2009 to 2012) and zero for pre-crisis years (2005 to 2008); X_{ijt} are control variables as defined and discussed in subsection 4.4.2.2 and γ_t and α_i are year and firm fixed effects respectively. ε_{ijt} is the error term. Standard errors are clustered at the firm level. The main variable of interest is β that captures the DiD effect.

A couple of points are worth noting before discussing the results of Equation (4-2) reported in Table 4-6. First, the coefficient of β reflects the marginal effect of a decline in FIIs' ownership on the board monitoring variables of the treated firms compared to control firms during the post-crisis period. As the financial crisis is a

negative shock that results in a decline in FIIs, we need to interpret the β coefficient inversely. For example, the positive coefficient of β on board size (as dependent variable) would suggest a higher board size for the treated firms, compared to control firms, after the shock when there is significant fall in FIIs' ownership. This signifies a negative link between FIIs' ownership and board size, suggesting that the higher FIIs' ownership (prior to the crisis) is associated with lower board size.

Second, motivated by the technically credible explanation offered by the existing literature (Guo and Masulis, 2015; Puri et al., 2011), we chose the linear probability model, as opposed to the non-linear (logit or probit) model, despite the binary nature of one of our dependent variables (*CEO power*) and other alternative dummy variables, for two reasons. First, non-linear models suffer from incidental parameter problems: i.e. fixed effects cannot be easily included in logit or probit model with large but narrow panels, which results in an inconsistent coefficient estimate of the DiD coefficient and the control variables. Second, as our main interest is the analysis of marginal effect, assessing the statistical significance of the marginal effect is less straightforward when the main variable of interest is in the interaction term. On the other hand, linear models provide consistent marginal estimates of our main explanatory variables and therefore provide an economically meaningful effect of the link between decline in FIIs' ownership due to the financial crisis and the board monitoring variables. Although our model choice is consistent with Puri et al. (2011) and Guo and Masulis (2015), we nevertheless, also estimate the results using the probit model and calculate the size and statistical significance of the marginal effect using the delta method. We find the probit estimates are of similar size to our linear probability model (the results are presented in Appendix 4-3).

Table 4-6: Regression-based difference-in-differences analysis

This table reports the results for the regression-based DiD with the following specification:

$$y_{it} = \beta\, Treated_i \times Crisis_t + X_{it} + \gamma_t + \alpha_i + \varepsilon_{it}$$

where i indexes firms, t indexes time; y_{ijt} is the dependent variable of interest, which is the different proxies of board monitoring; γ_t and α_i are year and firm fixed effects respectively; $Treated_i$ is the dummy variable that takes the value of 1 if the firms are classified as treated firms and 0 if firms are classified as control firms. $Crisis_t$ is also a dummy variable that takes the value of 1 in the post-crisis years (2009-2012) and 0 for the pre-crisis years (2005-2008); $X_{it}$are control variables; and ε_{it} is the error term. Treatment group is defined as the firms with "High FIIs" whereas Control group is defined as the firms with "High DIIs". "High FIIs" firms are those in which FIIs' ownership is above the median FIIs'' ownership and "High DIIs" firms are those in which DIIs' ownership is above the median DIIs' ownership before 2008. We use PSM with nearest neighbourhood of 0.01 caliper using various firm-level characteristics to identify matched control groups. Control variables are defined in Appendix 4-1. Standard errors are clustered at the firm level. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Board size (1)	Board independence (2)	Board busyness (3)	Board diligence (4)	Network size (5)	CEO power (6)	CEO pay (7)
$Treated_i \times Crisis_t$	0.053**	0.022**	0.095***	-0.030**	4.613***	0.042***	0.230***
	(2.58)	(2.37)	(2.60)	(-2.53)	(3.26)	(3.07)	(3.27)
Tobin's Q	0.008***	0.018**	0.001	0.002	0.130	0.002	-0.010
	(2.79)	(2.51)	(0.16)	(0.87)	(0.42)	(0.85)	(-0.47)
Firm size	0.098***	0.005	0.131***	-0.069***	5.716***	0.022***	0.389***
	(13.10)	(1.40)	(9.30)	(-17.06)	(10.13)	(2.59)	(11.93)
ROA	0.044	-0.020	0.211	-0.004	11.555**	0.088**	2.014***
	(0.65)	(-0.32)	(1.61)	(-0.05)	(2.34)	(2.37)	(3.50)
Firm age	0.036*	0.026***	0.130***	0.021*	5.266***	-0.006	0.182***
	(1.88)	(3.52)	(3.73)	(1.92)	(3.58)	(-0.08)	(3.01)
Leverage	-0.002***	0.002	-0.003***	0.001	-0.099***	-0.002*	-0.004
	(-3.15)	(0.54)	(-3.10)	(0.92)	(-3.05)	(-1.67)	(-1.13)
R&D	0.605	0.232	2.876***	-0.471	132.411***	-1.773	0.486
	(0.90)	(1.06)	(2.87)	(-1.30)	(2.89)	(-0.71)	(0.17)
STDDEV	-0.178**	-0.122***	-0.283	0.042	-9.082	0.023	-1.463***
	(-2.37)	(-3.15)	(-1.63)	(0.76)	(-1.65)	(0.46)	(-4.73)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.29	0.22	0.22	0.26	0.26	0.33	0.44
Observations	4,390	4,253	4,001	4,250	4,414	4,359	3,308

In Model 1 of Table 4-6, we report the results for the board size. The DiD estimator, β, is positive and statistically significant, suggesting that, compared to control firms, treatment firms increased the board size in the post-crisis period when the FIIs' ownership declined meaningfully. Our finding is consistent with the sub-hypothesis 1a and the theoretical intuition offered by Raheja (2005) and Harris and Raviv (2008) who suggest smaller boards to be more effective in executing their monitoring duties.

Next, in Model 2, we include board independence as our main dependent variable. The DiD estimator is positive and statistically significant, providing support for sub-hypothesis 2b, suggesting that FIIs in emerging markets do not seem to think that IDs improve board monitoring. As noted earlier, this result may suggest that FIIs hold the view that corporate managers in emerging markets could possibly appoint directors who may appear independent from a regulatory definitions point of view but may still be highly sympathetic to management (Cohen et al., 2012a; Romano, 2005).

In Model 3, the DiD coefficient of board busyness is positive and statistically significant, signifying FIIs' preference for reducing board busyness to improve the monitoring role of the board. This finding is consistent with our sub-hypothesis 3a and is in line with Falato et al. (2014) who find that busyness of boards has an adverse effect on the effectiveness of board monitoring (Core et al., 1999; Shivdasani and Yermack, 1999).

The DiD estimation of board diligence, as reported in Model 4, is negative and significant, offering credible backing to sub-hypothesis 4. This suggests that the treatment firms seem to have improved board diligence compared to the control firms in the years before the crisis period when FIIs' ownership is higher compared to the post-crisis period. Our result is consistent with the theoretical implications of Hermalin (2005) and Kolev et al. (2017) who propose that better board diligence improves board monitoring.

With respect to network size, as presented in Model 5, the significant and positive DiD coefficient endorses sub-hypothesis 5a. This signals that when contrasted with control firms, the network size of treated firms increased in the post-crisis period, which further signifies that FIIs tend to pressurize boards to reduce their network size

with the aim of improving the effectiveness of their monitoring role. This result is consistent with the predictions of Fich and White (2003), Fich and Shivdasani (2006) and Bizjak et al. (2009) who argue that boards with a smaller network size can perform better monitoring roles and reduce agency problems.

Similarly, we also examine the power of the CEO in Model 6. The DiD estimation is positive and statistically significant, lending support for sub-hypothesis 6. The result suggests that compared to the control firms, the treatment firms have powerful CEOs in the post-crisis period. This finding lends support to the agency theory, which argues that increased CEO power negatively affects the board monitoring of firms as they have access to useful firm resources and are inclined towards fulfilling their own managerial objectives ((Bebchuk and Fried, 2003; Combs et al., 2007; Hermalin and Weisbach, 1998; Onali et al., 2016; Ryan and Wiggins, 2004).

Finally, the β coefficient of CEO pay in Model 7 is also positive and statistically consistent with the prediction of sub-hypothesis 7a. The finding suggests that the treatment firms experience a significant increase in the pay of CEOs in the post-crisis period compared to the control firms. The evidence is in line with the literature that finds (excessive) CEO compensation exacerbates the agency problems rather than aligning the financial interests (Bertrand and Mullainathan, 2001; Core et al., 1999; Dah and Frye, 2017).

Taken together, the above results provide strong evidence of a causal link between FIIs and effective board monitoring. Though we find that FIIs condense board size, they also seem to reduce board independence in India. This indicates that FIIs do not have confidence in the true independence of IDs, casting doubt on the ability of the IDs to effectively monitor the board. As a substitute, we find that FIIs improve board monitoring through more direct channels, such as by improving board diligence and reducing board busyness, network size, power and pay of CEOs.

4.5.3 Robustness tests

To test the robustness of our baseline results, we conduct several additional tests. We use shock-based estimations, employ alternative definitions of board monitoring, followed by alternative identification strategy, and finally, conduct a series of false experiments.

4.5.3.1 FIIs' ownership level, instrumental variable approach and board monitoring

Our identification strategy relies on the assumption that the post-crisis period and its interaction with the treated firms capture the significant and exogenous shift in the ownership level of FIIs. However, this interaction term may be capturing other events, such as global risk aversion and not the exogeneity of changes in FIIs' ownership. To capture the specific effect of FIIs' ownership, we estimate the following regression equation:

$$y_{it} = \beta_1 Treated_i \times Crisis_t \times \Delta FII_{it} + \beta_2 Treated_i \times Crisis_t + \beta_3 Treated_i \times \Delta FII_{it} + \beta_4 Crisis_t \times \Delta FII_{it} + \beta_5 \Delta FII_{it} + X_{it} + \gamma_t + \alpha_i + \varepsilon_{it} \quad (4\text{-}3)$$

In Equation (4-3), ΔFII_{it} is the change in FIIs' ownership in firm *i* in the year *j*. Here, we have now interacted the DiD variable with actual time-varying change in FIIs' ownership variable. Now, the $Treated_i \times Crisis_t \times \Delta FII_{it}$ term not only captures the DiD effect but the actual exogenous change in FIIs' ownership driven by the crisis. All other variables are as previously defined. Firm and time fixed effects are included in the regression and standards are corrected for clustering at the firm level. As we interact the actual change in FIIs with the DiD variable, we need to interpret the β_1 as usual (compared to main regression where we interpret coefficient inversely). In other words, positive β_1 for board size would suggest a decrease in FIIs ownership is associated with higher board size for treated firms compared to control firms after the shock.

The results are presented in Panel A of Table 4-7. We find evidence consistent with our main results reported in Table 4-6. The level of FIIs' ownership is negatively and significantly related to the board size, board busyness, network size, CEO power

and CEO pay, and positively related to board diligence. However, we do not find any significant impact on board independence, which is not surprising given our main result which suggest FIIs' reduce the IDs.

The use of crisis as an exogenous shock and level of FIIs' ownership for the identification of treatment and control groups could be a problem, as the change in FIIs' ownership could be related to other external factors, such as change in firms' performance or lower market performance, that may not be captured by our existing control variables. To further mitigate the reverse causality or potential omitted variable biases, we perform an instrumental variable (IV) analysis. In this approach, first, we identify an IV that is correlated with the FIIs' ownership but not correlated with the error term in the regression. Following Desender et al. (2016), we generate an instrument by calculating the average of FIIs' ownership (except the focal firm) within the same industry and in similar size.[102] We argue that the FIIs' ownership within the same industry and similar size is likely to influence a firms' FIIs' ownership, but is unlikely to affect board level monitoring. To conduct the two-stage least squares (2SLS) regression, we replace ΔFII_{it} in Equation (4-2) with instrumented FIIs' predicted value from the first stage regression.

The results are presented in Panel B of Table 4-7.[103] The coefficient estimates on the interaction term among the treatment/control group, crisis and the instrumented FIIs' ownership' and the board monitoring variables, are consistent with the results reported in our main Table 4-6. Thus, our findings that a high level of FIIs' ownership is associated with improved board monitoring appears to be robust to these additional tests.

[102] We use the two-digit National Industry Classification code of India and four quartiles of firm size based on total assets. Since we exclude the focal firm in the calculation, the instrument varies across firm and time.

[103] For brevity, we do not report the first-stage regression results. In the first stage, we find the instrumental FIIs' ownership is positively and significantly related to the focal firms' FIIs' ownership. The coefficient ranges from 0.088 to 0.095.

Table 4-7: FIIs' ownership and instrumental variable regression

Panel A of this table reports the results for the following specification:

$$y_{it} = \beta_1\, Treated_i \times Crisis_t \times \Delta FII_{it} + \beta_2\, Treated_i \times Crisis_t + \beta_3\, Treated_i \times \Delta FII_{it} + \beta_4\, Crisis_t \times \Delta FII_{it-1} + \beta_5 \Delta FII_{it} + X_{it} + \gamma_t + \alpha_i + \varepsilon_{it}$$

where i indexes firms, t indexes time; y_{it} is the dependent variable of interest, which is the different proxies of board monitoring; γ_t and α_i are year and firm fixed effects respectively; $Treated_i$ is the dummy variable that takes the value of 1 if the firms are classified as treated firms and 0 if firms are classified as control firms. $Crisis_t$ is also a dummy variable that takes the value of 1 in the post-crisis years (2009-2012) and 0 for the pre-crisis years (2005-2008); ΔFII_{it} is the change in FIIs' ownership; X_{it} are control variables which are similar to Table 4-6; and ε_{it} is the error term.Treatment group is defined as the firms with "High FIIs" whereas Control group is defined as the firms with "High DIIs". "High FIIs" firms are those in which FIIs' ownership is above the median FIIs' ownership and "High DIIs" firms are those in which DIIs' ownership is above the median DIIs' ownership before 2008. We use PSM with nearest neighborhood of 0.01 caliper using various firm-level characteristics to identify matched control groups. Control variables are defined in Appendix 4-1. Standard errors are clustered at the firm level. Panel B presents the estimates using the IV method based on two-stage least square (2SLS) panel regression. We replace ΔFII_{it} in the equation used in Panel A with ΔIV_{it}. The ΔIV_{it}. is the average FIIs' ownership in similar size-matched firms in the same industry. The estimated parameters of the controls are not reported for brevity. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

Panel A: Level of FIIs' ownership

	Board size	Board independence	Board busyness	Board diligence	Network size	CEO power	CEO pay
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Treated_i \times Crisis_t \times \Delta FII_{it}$	-0.730**	0.218	-0.697**	0.231**	-30.701***	-0.604***	-2.141**
	(-2.16)	(1.14)	(-3.12)	(2.49)	(-2.86)	(2.78)	(-2.49)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.31	0.23	0.23	0.17	0.42	0.19	0.22
Number of observations	4,390	4,253	4,001	4,250	4,414	4,359	3,308

Panel B: Instrumental variable - second stage

	Board size	Board independence	Board busyness	Board diligence	Network size	CEO power	CEO pay
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Treated_i \times Crisis_t \times \Delta IV_{it}$	-0.761***	0.177	-0.616***	0.820***	-31.390**	-0.529***	-1.908***
	(-3.17)	(1.02)	(-3.21)	(2.48)	(-2.17)	(-3.63)	(-2.21)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.22	0.10	0.12	0.12	0.15	0.17	0.31
First stage *F*	60.67	58.71	57.87	57.70	58.12	56.55	50.76
Shea's partial R^2	0.19	0.27	0.29	0.27	0.21	0.18	0.19
Number of observations	4,390	4,253	4,001	4,250	4,414	4,359	3,308

4.5.3.2 Alternative proxies of board monitoring

In this section, we use alternative definitions of board monitoring. First, we use the level of board size and board independence as opposed to board size (log) and board independence (ratio). Ferreira et al. (2018) argue that level, rather than the ratio of independence (or size), is more informative. More importantly, the ratios and the percentage do not show what happens to the number of board members and independent members when there is a high level of FIIs' ownership prior to the crisis. Second, we use two alternative definitions of board busyness based on Core et al. (1999) and Fich and Shivdasani (2006).[104] Third, we use an alternative definition of CEO power, namely *Alternative CEO Power,* which is a dummy variable that takes the value of one if the CEO is chairman as well as the promoter and zero otherwise. Again, the results based on the probit model are presented in Appendix 4-2. Finally, as an alternative definition for our CEO pay, we use a fraction of variable pay/total pay as the dependent variable (Banerjee and Homroy, 2018).

The results using all these alternative measures of board monitoring are presented in Table 4-8. Consistent with the results reported in Table 4-6, we find that, on average, firms in the treatment group have 0.50 higher board members in the post-crisis period compared to the control group. Also, on average, compared to the firms in the control group, firms in the treatment group have 0.39 more IDs in the post-crisis era. The direction of the DiD coefficient for the alternative definition of board busyness, alternative CEO power and CEO variable pay is consistent with our main findings in Table 4-6.

[104] Refer to Appendix 4-1 for the definition.

Table 4-8: Robustness test: Alternative definitions of dependent variables

This table reports the robustness results for the regression-based DiD with the following specification:

$$y_{it} = \beta\, Treated_i \times Crisis_t + X_{it} + \gamma_t + \alpha_i + \varepsilon_{it}$$

where i indexes firms, t indexes time; y_{it} is the dependent variable of interest, which is the different alternate proxies of board monitoring. In model (1), the dependent variable is the number of members on the board, in model (2), the dependent variable is the number of IDs on the board, in model (3), the dependent variable is Core et al. (1999) definition of board busyness, in model (4), the dependent variable is Fich and Shivdasani (2006) definition of board busyness, in model (5), we use the alternate definition of CEO power and in model (6), the dependent variable is CEO variable pay. γ_t and α_j are year and firm fixed effects respectively; $Treated_i$ is the dummy variable that takes the value of 1 if the firms are classified as the treatment firms and 0 if firms are classified as the control firms. $Crisis_t$ is also a dummy variable that takes the value of 1 in the post-crisis years (2009-2012) and 0 for pre-crisis years (2005-2008); X_{it} are control variables defined in Appendix 4-1; and ε_{it} is the error term. Treatment group is defined as the firms with "High FIIs" whereas Control group is defined as the firms with "High DIIs". "High FIIs" firms are those in which FIIs' ownership is above the median FIIs' ownership and "High DIIs" firms are those in which DIIs' ownership is above the median DIIs' ownership before 2008. We use PSM with nearest neighborhood of 0.01 caliper using various firm level characteristics to identify the matched control groups. Standard errors are clustered at the industry level. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Board size (#)	Board independence (#)	Board busyness		Alternate CEO power	CEO variable pay
			Core et al. (1999)	Fich and Shivdasani (2006)		
	(1)	(1)	(3)	(4)	(5)	(6)
$Treated_i \times Crisis_t$	0.498***	0.393**	0.124***	0.094**	0.025**	0.319***
	(3.19)	(2.46)	(2.95)	(2.18)	(2.37)	(2.99)
Tobin's Q	0.409***	0.091	-0.006	-0.003	-0.001	-0.044
	(3.30)	(1.04)	(-1.39)	(-0.14)	(-0.84)	(-1.09)
Firm size	0.832***	0.353***	0.050***	0.067***	0.06**	0.667***
	(9.19)	(8.77)	(4.74)	(5.80)	(2.40)	(8.23)
ROA	-0.123	-0.156	0.113	0.189**	0.079	2.629**
	(-0.23)	(-0.32)	(1.27)	(2.21)	(1.59)	(2.44)
Firm age	0.420**	0.433***	0.084**	0.068**	0.112**	0.313**
	(2.22)	(4.44)	(2.90)	(2.47)	(2.25)	(2.58)
Leverage	-0.007	-0.006*	-0.001**	-0.003***	0.000	-0.044**
	(-1.48)	(-1.96)	(-2.65)	(-4.50)	(0.01)	(-1.99)
R&D	6.748**	5.479*	2.667***	2.692***	3.585	3.650
	(2.05)	(1.84)	(3.69)	(4.62)	(1.58)	(0.62)
STDDEV	-1.241*	0.345	-0.053	-0.243	0.003	-3.141***
	(-1.83)	(0.76)	(-0.44)	(-1.59)	(0.07)	(-4.36)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.41	0.19	0.09	0.10	0.84	0.34
Number of observations	4,385	4,253	4,391	3,937	4,359	2,044

4.5.3.1 Alternative identification and false experiments

The causal interpretation of an exogenous shock depends on the valid identification of the control group relative to those firms that are highly affected by the crisis. In our main analysis, the control group consists of firms with high DIIs' ownership but low FIIs' ownership. We rerun our main analysis with firms in the "None" category as control firms.[105] As discussed in Section 4.4.3, the "None" group consists of firms that are shunned by both FIIs and DIIs, i.e. these firms have lower FIIs' and DIIs' ownership. Like our main identification strategy, we follow the same PSM procedure and identify 538 matched pairs of treatment and control firms.

We rerun Equation (4-4) by replacing $Treated_i$ with $Alt\_Treated_i$, as shown in the following regression equation:

$$y_{it} = \beta\ Alt\_Treated_i \times Crisis_t + X_{it} + \gamma_t + \alpha_i + \varepsilon_{it} \qquad (4\text{-}4)$$

$Alt\_Treated_i$ is the dummy variable that takes the value of one for the firms in the "High FIIs" category and zero for the firms in the "None" category. All other variables are identical, as previously defined. For brevity, we do not report the outcomes of the control variables. From the results reported in Table 4-9, except for board independence, the findings are consistent with our main results, as reported in Table 4-6 and Table 4-7. Again, the insignificance of this variable suggests that FIIs are indifferent about IDs in the Indian firms where they invest.

An additional concern with our DiD estimates is that the changes we observe in board monitoring measures and FIIs could simply be capturing the continuation of a pre-existing regular trend, repeating itself on a regular basis. This concern is partly mitigated by the non-parallel trends observed in Figure 4-2 and by the inclusion of year fixed effects. Nonetheless, to further address this concern, we supplement the analysis by running a series of false experiments. The basic idea is that the underlying DiD effect (as shown in Table 4-6) should not be detected in periods other than the exogenous crisis event. Specifically, we run the following regression specification:

$$y_{it} = \beta\ Treated_i \times False\ Crisis_t + X_{it} + \gamma_t + \alpha_i + \varepsilon_{it} \qquad (4\text{-}5)$$

[105] This approach follows Patnaik and Shah (2013) who use "None" as their main control firms.

$False\ Crisis_t$ is the dummy variable that takes the value of zero for four years pre-false crisis year (t) and one for four years post-false crisis year respectively for each value of t (2005, 2006, 2012, and 2013). All other variables are as defined previously. We present only the DiD estimates, i.e. β in Table 4-10. Most of the DiD estimates for the false experiments are not significant. The sign of the board diligence is reversed in the false experiments and the statistical significance of CEO power is relatively low compared to our main results. Overall, the results from the false experiments provide some assurance that our main results in Table 4-6 are attributable to the change in FIIs' ownership as a result of the financial crisis, rather than to some other confounding event or pre-existing trend factors. Further, we also run a robustness test by excluding the observations for the crisis year i.e. 2008. The results are consistent with main results and are presented in Appendix 4-4.

Table 4-9: Robustness tests: Alternative identification of treatment and control firms

This table reports the alternate results for the regression-based DiD with the following specification:

$$y_{it} = \beta\ Alt\_treated_i \times Crisis_t + X_{it} + \gamma_t + \alpha_i + \varepsilon_{it}$$

where i indexes firms, t indexes time; y_{it} is the dependent variable of interest, which is the different proxies of board monitoring; $Alt\_Treated_i$ is the dummy variable that takes the value of 1 if the firms are classified as the alternate treated firms and 0 if firms are classified as the alternate control firms. $Crisis_t$ is also a dummy variable that takes the value of 1 in the post-crisis years (2009-2012) and 0 for pre-crisis years (2005-2008). X_{it} are control variables which are similar to Table 4-6; and ε_{it} is the error term. We include firm fixed effects, α_i and year fixed effects, γ_t. Treatment group is defined as the firms with "High FIIs" whereas the alternate control group is defined as the firms with "None". "High FIIs" firms are those one in which FIIs' ownership is above the median FIIs' ownership and "High DIIs" firms are those in which DIIs' ownership is above the median DIIs' ownership before 2008. We use PSM with nearest neighborhood of 0.01 caliper using various firm level characteristics to identify the matched control groups. Control variables are defined in Appendix 4-1. Standard errors are clustered at the firm level. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Board size	Board independence	Board busyness	Board diligence	Network size	CEO power	CEO pay
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Alt\_treated_i \times Crisis_t$	0.017**	0.007	0.075**	-0.035**	2.404***	0.031**	0.154***
	(2.14)	(0.86)	(2.15)	(-2.23)	(4.42)	(2.33)	(3.55)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.32	0.49	0.55	0.57	0.53	0.48	0.38
Number of observations	5,518	5,290	4,752	5,269	5,555	5,518	3,752

Table 4-10: Robustness test: false experiments

This table reports the coefficient estimates for the false experiments with the following specification:

$$y_{it} = \beta\, Treated_i \times False\ crisis_t + X_{it} + \gamma_t + \alpha_i + \varepsilon_{it}$$

where i indexes firms, t indexes time; y_{it} is the dependent variable of interest, which is the different proxies of board monitoring; γ_t and α_i are year and firm fixed effects respectively; $Treated_i$ is the dummy variable that takes the value of 1 if the firms are classified as the treated firms and 0 if firms are classified as the control firms. $False\ Crisis_t$ is a dummy variable that takes the value of 0 in the four years pre-false crisis year (2005, 2006, 2012, and 2013) and 1 for four years post-false crisis years. $X_{it}$are control variables which are similar to Table 4-6; and ε_{it} is the error term. Treatment group is defined as the firms with "High FIIs" whereas control group is defined as firms with "High DIIs" in Panel B. "High FIIs" firms are those in which FIIs' ownership is above the median FIIs' ownership and "High DIIs" firms are those in which DIIs' ownership is above the median DIIs' ownership before 2008. We use PSM with nearest neighborhood of 0.01 caliper using various firm level characteristics to identify the matched control groups. Control variables are defined in Appendix 4-1. Standard errors are clustered at the firm level. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Board size (1)	Board independence (2)	Board busyness (3)	Board diligence (4)	Network size (5)	CEO power (6)	CEO pay (7)
$Treated_i \times False\ crisis_{2005}$	0.022	0.015	0.085	0.022	8.123	0.012	0.077
	(0.84)	(1.12)	(1.22)	(1.12)	(1.37)	(0.66)	(0.99)
$Treated_i \times False\ crisis_{2006}$	0.020	0.001	0.042	-0.013	6.215	0.012	0.121
	(1.01)	(0.23)	(0.75)	(-1.02)	(1.22)	(1.11)	(1.41)
$Treated_i \times False\ crisis_{2012}$	0.011	0.015	0.055	0.011	2.521	0.038*	0.125
	(0.37)	(1.27)	(1.33)	(0.55)	(1.17)	(1.92)	(1.09)
$Treated_i \times False\ crisis_{2013}$	0.025	0.011	0.042	0.022**	1.511	0.021	0.127
	(1.31)	(1.20)	(1.23)	(2.12)	(0.77)	(0.91)	(1.22)

4.6 Conclusion

One of the key trends in the global financial market during the financial crisis of 2007-08 was the "flight of capital" from emerging markets to the developed economies. India, one of the largest emerging economies, also witnessed a substantial outflow of foreign capital in the aftermath of the crisis. From an empirical identification point of view, this crisis represents an unexpected negative shock to FIIs' ownership in India, making it an ideal set-up to investigate the role of FIIs in influencing the monitoring role of boards. In this study, we focus on the four years pre-crisis and post-crisis beginning in 2008 and use different proxies of board monitoring to evaluate the impact of FIIs on the board monitoring of the firms that they invest.

The literature on corporate governance notes that FIIs, being informed and sophisticated investors, have the incentive as well as the ability to improve board monitoring. Our study adds to this literature by providing causal evidence of FIIs' influential role in improving the effectiveness of board monitoring. Consistent with economic arguments, the results show that firms with higher FIIs' ownership are associated with lower board size, busyness, network size, CEO power, and CEO pay and higher board diligence. Interestingly, we also find that FIIs prefer lower board independence in India. However, our result on board independence is counter-intuitive, but not surprising, given the empirical evidence that managers in emerging markets may appoint directors who are independent from the point of view of the regulators but they are still connected and sympathetic to the existing management. We also find that FIIs improve the performance of the firms through their improved board monitoring role. Specifically, we find that the enhanced board monitoring by FIIs improves both firm value and corporate innovation measures.

These results highlight the importance of FIIs in emerging markets. Given our evidence of improved board monitoring by FIIs and subsequent positive influence on firm performance, firms that suffer from governance and monitoring problems might find it beneficial to attract FIIs' investments. Our empirical results highlight the positive externalities generated by FIIs in emerging markets.

Appendix 4-1: Definition of variables

This table presents the description of our key variables used in this study.

Variables	Definition
Board Monitoring	
Board size	Log of number of directors on the board.
Board independence	Percentage of independent directors (IDs) on the board.
Board busyness	Log of number of directors who serve on the board of other firms.
Board busyness (Core et al., 1999)	Dummy variable 1 if the majority of members hold three, or more than three, board appointments in another firm.
Board busyness (Fich and Shivdasani, 2006)	Dummy variable 1 if the majority of IDs serve on three or more other corporate boards.
Board diligence	Mean value across all board members of the ratio of meetings attended to the total meetings held in a year.
Network size	The number of other firms with which the given firm shares common directors.
CEO power	Dummy variable 1 if CEO is the chair, promoter and the only executive member on the board or else 0.
Alternate CEO power	Dummy variable 1 if CEO is also the chair of the board and the founder/promoter of the firm.
CEO pay	Log of total compensation (sitting fees, salaries, contributions to provident fund, pension fund, bonus and commission, perquisites, and retirement benefits)
Independent Variables	
Treated	Dummy variable 1 if the firm is in the treatment group or else 0. Treatment group is defined as the firms with "High FIIs" whereas Control group is defined as the firms with "High DIIs". "High FIIs" firms are those in which FIIs' ownership is above the median and "High DIIs" firms are those in which DIIs' ownership is above the median before 2008.

Crisis	Dummy variable 1 for the pre-crisis period (2006-2008) and 0 for the post-crisis period (2009-2011).
$Year_{05-06}$	Dummy variable 1 if a firm-year observation is from year 2005 or 2006
$Year_{07}$	Dummy variable 1 if a firm-year observation is from year 2007
$Year_{08}$	Dummy variable 1 if a firm-year observation is from year 2008
$Year_{09}$	Dummy variable 1 if a firm-year observation is from year 2009
$Year_{10}$	Dummy variable 1 if a firm-year observation is from year 2010
$Year_{11-12}$	Dummy variable 1 if a firm-year observation is from year 2011 or 2012.

Institutional Ownership

FIIs' ownership	Percentage of shares held by foreign institutional investors
DIIs' ownership	Percentage of shares held by domestic institutional investors
Δ FIIs	Change in FIIs' ownership (in % points)
Δ DIIs	Change in DIIs' ownership (in % points)

Other Financial Variables

Firm size	Log of total assets
Firm age	Log of the age of firms (Incorporation year – year)
Leverage	Ratio of total debt to the shareholders' equity (in %)
STDDEV	One-month standard deviation of daily stock return
Sales	(Log) of total sales revenue
Export	Percentage of export sales revenue to sales revenue
Capital expenses	Total capital expenses scaled by total assets

Firm Performance variables	
Return on assets	Net income divided by total assets (in %)
Tobin's Q	Ratio of the sum of the book value of debt, book value of preferred stock and market value of the stock to the book value of assets (in times)
Earnings per share	Net profit or (loss) after the deductions of preference divided by the weighted average number of shares outstanding scaled by average closing price
PBDITA	Profit before depreciation, interest, taxation and amortization scaled by total assets (in %)
Assets turnover ratio	Ratio of total sales and total assets (in times)
Innovation Variables	
Patent count	Number of patent applications filed in a given fiscal year
R&D	Total research and development expenses scaled by total assets

Appendix 4-2: Correlation matrix

The table presents the correlation matrix for the control variables included in the empirical analysis. Please see Appendix 4-1 for the definition of control variables. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Tobin's Q	Firm Size	ROA	Firm age	Leverage	R&D	STDDEV
Tobin's Q	1						
Firm size	0.164***	1					
ROA	0.128***	0.106***	1				
Firm age	0.0780***	0.233***	0.0861***	1			
Leverage	-0.0036	0.00816	-0.133***	-0.00708	1		
R&D	0.00378	0.0852***	0.0543***	0.124***	-0.0356*	1	
STDDEV	-0.0144	-0.213***	-0.130***	-0.151***	0.0772***	-0.133***	1

Appendix 4-3: Robustness tests using a linear probability model

This table reports the results using the probit model. Both the coefficient and the marginal effect calculated using the delta method are reported. The main dependent variables are different proxies of board monitoring coded in binary. See Appendix 4-1 for definitions. $Treated_i$ is the dummy variable that takes the value of 1 if the firms are classified as treated firms and 0 if firms are classified as control firms. $Crisis_t$ is also a dummy variable that takes the value of 1 in the post-crisis years (2009-2012) and 0 for the pre-crisis years (2005- 2008). We include firm fixed effects and year fixed effects. Treatment group is defined as the firms with "High FIIs" whereas Control group is defined as the firms with "High DIIs". "High FIIs" firms are those in which FIIs' ownership is above the median FIIs' ownership and "High DIIs" firms are those in which DIIs' ownership is above the median DIIs' ownership before 2008. We use PSM with nearest neighborhood of 0.01 caliper using various firm-level characteristics to identify matched control groups. Control variables are defined in Appendix 4-1. Standard errors are clustered at the firm level. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	CEO power (1)		Board busyness				Alternate CEO power (4)	
			Core et al. (1999) (2)		Fich and Shivdasani (2006) (3)			
	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect
$Treated_i \times Crisis_t$	0.112***	0.043***	0.090**	0.028**	0.193***	0.068***	0.144***	0.022***
	(3.25)	(9.33)	(2.23)	(2.25)	(3.78)	(3.84)	(5.54)	(3.33)
Tobin's Q	0.002		-0.018		-0.002		-0.052***	
	(0.27)		(-1.58)		(-0.26)		(-2.78)	
Firm size	0.054**		0.159***		0.187***		0.084***	
	(2.48)		(15.83)		(15.01)		(7.20)	
ROA	0.218**		0.406*		0.494**		0.537**	
	(2.05)		(1.81)		(2.06)		(2.23)	
Firm age	0.094***		0.245***		0.184***		0.031	
	(4.52)		(5.68)		(6.60)		(1.16)	
Leverage	-0.003		0.008**		0.018**		0.014***	
	(-1.60)		(2.47)		(2.16)		(3.89)	
R&D	-6.810***		-9.106***		-7.552***		-7.583***	
	(-2.78)		(-6.71)		(-4.02)		(-4.07)	
STDDEV	-0.700**		-0.139		-0.674**		0.370	
	(-2.07)		(-0.49)		(-2.45)		(0.91)	
Firm fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
Log likelihood	-157.50		-240.26		-243.82		-218.63	
Number of observations	4,168		4,315		3,904		4,200	

Appendix 4-4: Robustness tests: Regression based DiD without financial crisis year

This table reports the results for the regression-based DiD with the following specification:

$$y_{it} = \beta\ Treated_i \times Crisis_t + X_{it} + \gamma_t + \alpha_i + \varepsilon_{it}$$

where i indexes firms, t indexes time; y_{ijt} is the dependent variable of interest, which is the different proxies of board monitoring; γ_t and α_i are year and firm fixed effects respectively; $Treated_i$ is the dummy variable that takes the value of 1 if the firms are classified as treated firms and 0 if firms are classified as control firms. $Crisis_t$ is also a dummy variable that takes the value of 1 in the post-crisis years (2009-2012) and 0 for the pre-crisis years (2005-2007); $X_{it}$are control variables; and ε_{it} is the error term. Treatment group is defined as the firms with "High FIIs" whereas Control group is defined as the firms with "High DIIs". "High FIIs" firms are those in which FIIs' ownership is above the median FIIs'' ownership and "High DIIs" firms are those in which DIIs' ownership is above the median DIIs' ownership before 2008. We use PSM with nearest neighbourhood of 0.01 caliper using various firm-level characteristics to identify matched control groups. Control variables are defined in Appendix 4-1. Standard errors are clustered at the firm level. In this table, *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Board size (1)	Board independence (2)	Board busyness (3)	Board diligence (4)	Network size (5)	CEO power (6)	CEO pay (7)
$Treated_i \times Crisis_t$	0.057***	0.022**	0.102***	-0.030**	4.654***	0.015**	0.214***
	(2.75)	(2.34)	(2.79)	(-2.43)	(3.28)	(2.18)	(3.00)
Tobin's Q	0.007***	-0.020***	-0.000	0.002	0.031	0.003	-0.015
	(2.65)	(-2.66)	(-0.04)	(1.28)	(0.11)	(1.34)	(-0.72)
Firm size	0.098***	-0.004	0.132***	-0.068***	5.672***	-0.024**	0.388***
	(13.29)	(-1.05)	(9.45)	(-16.86)	(10.00)	(-2.54)	(12.05)
ROA	0.049	-0.045	0.210	-0.010	11.335**	0.081**	1.904***
	(0.72)	(-0.72)	(1.61)	(-0.13)	(2.32)	(2.25)	(3.33)
Firm age	0.038*	0.025***	0.134***	0.017	5.379***	0.000	0.193***
	(1.96)	(3.45)	(3.78)	(1.53)	(3.59)	(0.00)	(3.16)
Leverage	-0.002***	-0.000	-0.002***	0.000	-0.093***	0.002*	-0.004
	(-3.19)	(-0.13)	(-2.98)	(0.78)	(-3.13)	(1.70)	(-1.13)
R&D	0.863	0.136	2.822***	-0.493	139.912***	-2.337	0.060
	(1.34)	(0.56)	(2.68)	(-1.22)	(3.02)	(-0.89)	(0.02)
STDDEV	-0.138*	0.102**	-0.279	0.018	-8.448	0.021	-1.405***
	(-1.79)	(2.53)	(-1.59)	(0.32)	(-1.50)	(0.38)	(-4.25)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.29	0.08	0.22	0.26	0.25	0.73	0.44
Observations	3,824	3,709	3,492	3,706	3,847	3,794	2,886

Chapter 5. Discussion and conclusion

This PhD thesis consists of three empirical investigations exploring the behaviour of FIIs/FIIs and their implications. The first empirical investigation (Chapter 3) explores the market power of FIIs in influencing the policies of host government. The second empirical investigation (Chapter 4) examines how FIIs improve their investment performance by exploiting the information content of insiders' trades. The third empirical investigation (Chapter 5) studies whether FIIs play role in improving the board monitoring and its effectiveness.

In this section, we take a stock of the major findings and contributions of these empirical investigations, point out some limitations and shortcoming of this research as well as discuss avenues for future research, and finally conclude the thesis.

5.1 Summary of major findings and contribution

5.1.1 Tax threat and disruptive market power of FIIs

Empirical evidence suggests that FIIs can indirectly influence the host government policies by pressurizing the domestic shareholders/managers, who could lobby the domestic regulators to make changes in the policies that suit the investment preferences of FIIs (Durnev et al., 2015; Kerner, 2015). In this empirical study, we argue that FIIs also have a direct market-based power to influence the policymaking of host government and they derive this power by explicitly withdrawing from the market.

We examine this theoretical motivation by exploiting an unexpected announcement in India that generated a considerable period of threat of additional tax liability on the retrospective transactions and past income earned by FIIs. Specifically, we investigate the announcement related Minimum Alternate Tax (MAT) on April 1, 2015 that created ambiguity surrounding a retrospective taxation on incomes earned by FIIs on transactions conducted prior to April 1, 2015. The tax demand was valued at around US$ 6.4 billion. After period of five months of uncertainty, a second announcement cleared FIIs of any retrospective tax liability. We use this period of five months to study three key questions: What is the trading behaviour (size and direction) of FIIs during the MAT threat period? What are the implications of FIIs' trading on

stock volatility, liquidity and returns? How do FIIs react in the post MAT threat period when the tax threat disappears?

In response to above mentioned questions, we report three key findings. First, we find that there is a significant and economically material withdrawal by FIIs (within seven trading days) during the threat period of five months. On average, the withdrawal translates into a daily decline of 0.309 basis points of market capitalization for an average equity, reflecting approximately an average of Indian Rupees (INR) 7.27 million per firm per day.

Second, we find that the withdrawal by FIIs has significant influence on the stock market characteristics. The outflows increase the stock volatility significantly. We also find a substantial increase in the volatility risk premium (difference between option-implied and realized volatility) suggesting a significant rise in the market risk premium. We also find a substantial returns and pricing effects. We find an excess cumulative abnormal stock return (CAR) of -6.53% for 20 days following the first announcement (MAT threat). We also perform a long-short strategy on firms most affected and firms least affected by MAT threat and find a decline of 18 basis points of daily returns on a typical equity for long strategy and a rise of 23 basis points for the short strategy.

Finally, we also examine the flow of equity trading by FIIs after the second announcement that eliminated the tax threat. We do not find significant evidence of inflows after the second announcement. We also find a subdued effect on the stock return post the second announcement. The findings suggest the long-term detrimental effect of policy changes.

Overall, we find that the market withdrawal is a direct channel through which FIIs could influence government policies. Consistent with previous empirical evidence, we find FIIs are sensitive to changes in tax policies.

This empirical investigation contributes to streams of literature. First, we contribute to the literature on FIIs influence on government policies and suggest that FIIs possess a direct market-based power through which FIIs can influence policymaking by effectively withdrawing investments from the host market. Second,

we also contribute to the literature on importance of tax subsidy to FIIs. We find that when tax subsidies are threatened, FIIs react negatively that leads to disruptive effect on the market. Third, we make contribution to the literature that analyse the impact of tax regimes on FIIs. Fourth, our study also interacts with the literature that study the foreign investments and tax avoidance. We use an exogenous shock to establish a causal link between FIIs' trading activities and the benefits of tax avoidance. Finally, we also contribute to the debate relating the effect of FIIs on emerging markets. The investigation reveals a disruptive effect on emerging stock market due to sudden withdrawal by FIIs.

5.1.2 Mimicking the insiders' trades by FIIs

FIIs face higher information asymmetry challenge in the emerging markets compared to DIIs and other investors. This asymmetry stems from several sources such as physical distance, language barriers, cultural barriers and proximity to information that result in sub-optimal portfolio allocation by FIIs in emerging markets. As a result, FIIs seek to improve their investment performance by reducing this information barrier through greater transparency, better governance, improved board performance, and strong shareholder activism. In addition, they extensively scrutinize and examine information that are available both publicly and privately. In this empirical investigation, we argue that FIIs exploit the information content of a special public disclosure: insiders' trading.

The information content of insiders' trading has been extensively examined and the consensus is that insiders' trades, specially buy trades, earn significant abnormal returns. More recent literature argues that not all insiders' trades are equally informative as some (most) of these trades are conducted routinely such as pre-approved routine trades, trades conducted for hedging, diversification and liquidity needs. They argue that there are some "opportunistic" trades that convey private information about firms' future performance and the portfolio strategy based on these opportunistic insiders' trades earn superior abnormal returns compared to strategy based on routine insiders' trades (Ali and Hirshleifer, 2017; Cohen et al., 2012b). In this study, after confirming the information importance of opportunistic insiders' trades in India, we investigate two key issues. First, we test whether FIIs trade in the

same direction as past opportunistic insiders, which we refer to as the mimicking hypothesis. Second, we investigate whether FIIs, who mimic insiders' opportunistic trades, earn superior abnormal return.

Examination of these research questions reveal some important findings. First, we find that the information content of opportunistic insiders' trades in emerging markets is superior than the information content of opportunistic insiders' trades in developed markets. Opportunistic trades earn around 243 basis point in the month following the trades in emerging market compared to 158 basis points in developed market. Second, we find that the FIIs' trading is significantly and positively related to the past opportunistic insiders' buy trades, providing support for the mimicking hypothesis. We find that the existing FIIs who hold the shares of the company as well as new FIIs who had not traded on the company mimics the insiders' trades. Finally, we also conduct calendar-time portfolio analysis and event study analysis to confirm that those FIIs who mimic insiders' trades earn significant abnormal returns.

This empirical investigation makes two important contribution to the literature. First, to the best of our knowledge, this is the first study in emerging markets that analyse the information content of insiders' trades segregating them into routine and opportunistic trading. Second, and more importantly, we extend Cohen et al. (2012b) by providing extensive evidence that FIIs' mimic the insiders' trades in emerging markets and earn superior abnormal return by doing so.

5.1.3 FIIs and board monitoring

Do FIIs improve board monitoring of the firms in which they invest? This is the key research question that we examine in this final empirical investigation. Huang and Zhu (2015) argue that FIIs act as an activist "outside" shareholders and are likely to perform arm-length monitoring of board to mitigate the expropriation of minority shareholders. However, a causal link between the FIIs' ownership and board monitoring has been difficult to establish due to the endogeneity problems (Gillan and Starks, 2003). In this study, we use an exogenous shock that significantly reduce the ownership by FIIs to establish a relationship between FIIs and board monitoring.

Specifically, we exploit 2007-08 financial crisis as an exogenous shock that significantly diminishes the ownership of FIIs in the Indian market. The use of this setting allows us to investigate two key issues: whether sudden decline in FIIs' ownership result in changes in the board monitoring and whether such decline in FIIs' also moderates the relationship between board monitoring and firm performance (firm value and innovation). We use seven proxies to measure the board monitoring: board size, board independence, board busyness, board diligence, network size, CEO power, and CEO pay level.

This empirical investigation reveals following key findings. First, FIIs reduce the size of the board, lessen the board busyness, improve the board diligence, reduce the network size of the board, decrease the power of the CEO as well as the level of compensation of CEO. Interestingly, we find that FIIs' ownership is negatively related to board independence, which suggests that FIIs do not view independent directors to be truly independent and value enhancing.

This empirical investigation contributes to several strands of literature. We extend the literature that examines the link between FIIs' ownership and board monitoring (Aggarwal et al., 2011; Gillan and Starks, 2003; Huang and Zhu, 2015). We use a quasi-natural experimental setting of 2007-08 financial crisis to provide a comprehensive evidence on the link between FIIs' ownership and board monitoring as well as their effectiveness.

5.2 Implications

The thesis leaves a number of policy level implications. Regulars in emerging markets are keen to attract foreign investors due to benefits such investors bring into the economy. Therefore, it is crucial for regulators to understand the factors that influence their decision to invest and how both firm-level and policy-level factors affect the investment flows by such investors.

The findings of our first investigations carry important implications for policymakers in emerging markets. Graetz and Grinberg (2002) argue that robust and credible empirical evidence on the effects of taxation on international portfolio allocation is

required to better inform policymakers. Therefore, our study provides empirical evidence that tax advantages are one of the important attractions for FIIs in emerging markets. However, any proposed change that risks curtailing a tax advantage can act as a sufficient trigger for FIIs to exit the market, which may further carry unintended stock market ramifications. This could put pressure on policymakers, cognizant of the benefits FIIs offer to the domestic markets, to provide tax subsidies to retain their investment and any tax uncertainty seems to have a damaging effect on the confidence of FIIs.

The results of our second empirical investigations have implications for both FIIs and policymakers. We provide insights into FIIs' trading behavior, as the information content of opportunistic insiders' trading enables them to reduce their informational disadvantage. More importantly, identifying opportunistic insiders' trading that is value-relevant could provide important information to policymakers to protect the integrity of the market. The behavior of FIIs in relation to the insiders' trading is also particularly important to policymakers because FIIs are among the largest and most active shareholders in India (holding around 40% of freely floated shares) and play an important role in security pricing, liquidity and the cost of capital as well as corporate monitoring (Bekaert and Harvey, 2002; Desender et al., 2016; Kim and Singal, 2000; Ng et al., 2016).[106]

Finally, the results of our third empirical investigation suggest that opening an emerging market to FIIs can be an effective way to improve the effectiveness of board monitoring and potential agency problems. This, in turn, should benefit the minority/outside shareholders. For emerging markets that are characterized as having poor corporate governance practices, higher informational inefficiencies, opaque markets and less stringent enforcement of regulations, the findings support the argument that FIIs could generate positive externalities in emerging markets through their board monitoring activities.

[106] "More foreign funds to face India tax demands", *Financial Times*, April 13, 2015

5.3 Limitations and future areas of research

5.3.1 Limitations

In this section, we acknowledge some limitations of this thesis and discuss avenues for future area of research.

This empirical study is affected by the limitations imposed by the availability of data. In the first empirical investigation, we do not have access to the similar level of trading data for domestic portfolio investors as we have for FIIs. A comparison of the reaction of domestic portfolio investors, whose income was not affected by the tax threat, with the reaction of FIIs would have given us an in-depth insight of true effect of such threat.

We also do not have access to classification of FIIs. FIIs in India are classified into Category I (such as sovereign funds, central banks and government agencies), Category II (such as pension funds, mutual funds, investment banks, banks and insurances), and Category III (such as charitable trusts, corporate bodies and individuals). Availability of data on such detailed classification would have provided better insights on behaviour of these individual classes of FIIs.

Likewise, in the second empirical investigation, we do not have access to the insiders' trading data from National Stock Exchange (NSE) of India. A rich data set on insider' trading from both major stock exchanges in India would certainly have enriched our claims. Further, we are also not able to classify whether the insiders' trades were conducted by CEOs, chairman, non-executive directors, independent directors or other insiders. Such classification would have enabled us to identify whose trades do the FIIs mimic.

Further, in the final empirical investigation, we also do not have data on classification of FIIs' ownership. Such detailed classification of FIIs' ownership could have helped us identify the type of FIIs that play greater role in improving board monitoring. Nonetheless, these data limitations do not undermine our empirical findings.

The empirical investigations also rely on identification of treatment and control firms. Due to data limitations discussed above, we do not have a natural classification of treatment and control groups. Instead, we rely on a quasi-natural classification

strategy discussed in the individual chapters. We, therefore, use several robustness tests to make a claim that our results are not sensitive to different alternate classification of treatment and control groups.

Another shortcoming of this thesis is the issues related to the exogenous shocks themselves. The research design used in this study is not a "pure" quasi-natural experiment. In the first empirical investigation, we use a tax threat related to MAT as a tax-related policy event. It may be argued that the MAT announcement was a threatened retrospective expropriation event and not a traditional tax-policy changes, hence, the FIIs flows may not be attributable to the tax event. To overcome this issue, we perform a non-parametric permutation tests on several placebo events as well as several other robustness tests discussed in Section 3.5.4. We find that the FIIs outflow was indeed attributable to the tax event rather than any other confounding factors. In the third empirical investigation, we use 2007-08 financial crisis as an exogenous shock. It may be argued that crisis had a direct effect on different firm-level characteristics and FIIs decision to change their holdings may be driven by the firm-level characteristics rather than the crisis itself. To overcome this issue, we control for several firm-level characteristics (along with firm and time fixed effects) that affect FIIs decision to invest in a firm. Further, we also conduct several placebo tests, instrumental variable and other robustness tests as discussed in Section 4.5.3.

This thesis examines the research questions in the context of one emerging market: India. Though, the characteristics of Indian market is similar to several other emerging markets, we need to interpret the results with caution, for they may not be readily generalisable to all emerging markets.

5.3.2 Future areas of research

This thesis focuses on empirical investigations of the trading behaviour of FIIs as well as their implications. The obvious extension of this research would be analysing the trading behaviour of DIIs as well as their implications in emerging markets. Furthermore, analysis of similar research questions in cross-country setting (conditional on the availability of same level of granular data) would render generalisable findings.

Given the granular level of FIIs' trading data, future research can identify different type of FIIs analysing the past trading behaviour such as short-term investors, long-term investors, passive investors, active investors, index investors and so on. These classifications will allow future research to explore the heterogeneity within FIIs and their effect on the market.

Further research can also analyse the information content of the FIIs' trades itself. FIIs need to invest significant amount of time and resources to process information to beat the market. Hence, large trades conducted by FIIs may possess private information about the firm they are trading. Further, any trades conducted prior to the earnings announcement or repurchase announcements would also have significant amount of information about the financial performance of a company. Analysing such information content of FIIs' trades would contribute to the literature on institutional trading and its impact on prices (Bozcuk and Lasfer, 2005).

5.4 Concluding remarks

This thesis consists of three empirical investigations that examine three key issues related to FIIs in emerging markets: Do FIIs influence policymaking in host government? Can FIIs reduce information asymmetry in emerging market and improve their investment performance by exploiting the information content of insiders' trading? Can FIIs improve the board monitoring and their effectiveness?

We find evidence that FIIs hold a direct-market based power to institute changes in the host-government policies and they derive this power through their ability to withdraw from the market. We also find evidence that these FIIs can improve their investment performance by mimicking the trading direction of opportunistic insiders. Finally, we also present findings that FIIs can improve the board monitoring in emerging markets and they play a moderating role in the relationship between board monitoring and firm performance.

We make several contributions to the research that examines the trading behaviour of FIIs as well as their implications in the emerging markets. The findings of this thesis suggest policymakers to develop appropriate policies that suit the investment preferences of FIIs. The presence of such FIIs brings positive externalities not only to the market but also to the firm they are investing in.

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