Tax threat and the disruptive market power of foreign portfolio investors

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Abstract

We investigate the equity trading behaviour of foreign portfolio investors (FPIs) and the potential stock market implications during a period of tax treatment uncertainty in the Indian emerging market. Theoretical arguments predict that the trading reactions (entry and exit) of FPIs not only depend on the severity and credibility of the tax reforms, but also on FPIs' ability to harm the host capital market by their actions. FPIs may promptly and materially exit the host capital market in response to tax policy reforms that impose potential additional costs. Economic arguments also posit that these withdrawals may carry significant negative implications for the host stock market. Further, given FPIs' experience regarding the questionable credibility of the host country's tax reforms and lingering uncertainty on future tax changes, FPIs may not re-enter the market with the same speed and volume as they exited, once the tax threat has been removed. The findings of our quasi-experimental set-up, exploiting a significant exogenous tax reform and using unique FPIs' transaction-level data, are consistent with these theoretical expectations.

JEL Classification: G11, G18

Key Words: Foreign portfolio investors, Tax threat, Market withdrawal, Disruptive implications, Policy reversal.

Introduction

The importance of foreign portfolio investors (FPIs), particularly in capital-constrained emerging markets, is theoretically and empirically well documented (Bekaert and Harvey, 2003). The presence of FPIs is associated with higher stock prices, lower cost of capital, better firm-level information environment, greater protection of minority shareholders, improved regulations that govern the market and trading activities, and the development of new institutions, services, and trading technologies (Bekaert and Harvey, 2000, 2002; Errunza, 2001; Stulz, 1999). These advantages have a positive impact on economic growth, which are measured not just in terms of monetary values, but more importantly in elevating a large number of the deprived populace in emerging markets to a better standard of living (Bekaert and Harvey, 2003).

Recognizing these benefits, regulators in emerging markets often formulate policies to attract and retain FPIs (Errunza, 2001; Leuz, Lins and Warnock, 2009). Recent evidence suggests that FPIs themselves may indirectly influence host government policies by exerting pressure on domestic shareholders and managers to lobby regulators towards policy convergence, i.e. to alter policies in favour of FPIs (Kerner, 2015).[1] In this study, we empirically examine whether FPIs also possess a direct market-based means of changing government policies. We argue that the implications of a market-based trading reaction by FPIs could hold the potential to sway regulators towards policy convergence.

In terms of the theoretical lenses, our base framework is motivated by the international diversification portfolio-based theory of Bacchetta and Van Wincoop (2000) and the literature on economic policy uncertainty. This international capital asset pricing model (ICAPM) predicts that the higher the deadweight costs associated with barriers to investing in a particular

[1] Similarly, Durnev *et al.* (2015) argue that FPIs can indirectly lobby and interact with the host country government by investing in firms controlled by domestic investors.

equity market, such as the enforcement of additional taxes, the less attractive the market and thus the greater the likelihood that existing FPIs will withdraw. These withdrawals should be more pronounced when policy announcements or enforcement threats are sudden and uncertain. Further, trading reactions (entry and exit) of FPIs may not only depend on the severity and credibility of the tax reforms, but also on FPIs' ability to harm the host capital market by the implications of their withdrawal. In this study, we test these theoretical predictions by examining the equity trading behaviour of FPIs in India, and the associated stock market implications of such behaviour for an uncertain tax threat, known as Minimum Alternative Tax (MAT).

Although FPIs in India are liable to pay short-term capital gains tax of 15% (0% on long-term capital gains), most of these investors pay almost no taxes by taking advantage of double-taxation treaties, with critics arguing that the government effectively provides tax subsidies to FPIs. Since 2010 there has been an effort by the Indian regulators to tax FPIs with the proposed imposition of MAT; however, there had been no material changes in FPIs' trading as the regulatory agencies were undecided on whether to impose MAT on FPIs. During this period of tax policy uncertainty, the Indian Tax Department (ITD) unexpectedly issued notices to nearly 100 FPIs in March 2015 (up to the 21st March) threatening enforcement of MAT on all retrospective transactions undertaken before 1st April 2015. Although we consider all other important dates surrounding the MAT-related policy announcements, our primary focus is on the period after 21st March 2015, referred to as the *post-MAT threat* period, to assess FPIs' trading behaviour and the ensuing stock market implications. The Indian regulators provided clarity on 1st September 2015 when they resolved the policy uncertainty around MAT liability. We refer to this date as the *uncertainty resolution date* (see section 2 for more details).

Although announcements of government policy changes are significant, regulatory economics theory highlights the importance of the stronger impact of enforcement in triggering actions from market participants (Coffee, 2007; Jackson and Roe, 2009). Hence, we examine three key issues related to the government's MAT enforcement threat on FPIs: First, the trading behaviour (size and direction) of FPIs following the *MAT threat date*; Second, firm-level stock market implications of FPIs' trading following the *MAT threat date* and finally, FPIs' trading reactions after the *uncertainty resolution date* when the tax enforcement threat recedes.

The Indian setting offers several unique advantages to examine these research questions. First, the MAT enforcement threat provides an ideal quasi-experimental set-up to establish causality, enabling us to isolate its effect from other possible factors driving FPIs' trading. Second, our study benefits from the availability of a unique trade-level granular database that allows us to investigate FPIs' trading reactions over short- and long-window periods and the associated stock market implications. Finally, relative to their developed counterparts, the characteristics of the Indian equity market (higher family/individual ownership concentration, lower investor protection standards, more imperfect capital markets, and weaker environment of legal enforcement) are similar to other emerging economies (Gaur and Kumar, 2009; Gopalan and Gormley, 2013). Thus, the findings of this study could to some extent be generalized across other emerging markets.

Consistent with the theoretical predictions, we find that not all tax policy announcements trigger material FPIs' trading reactions, but the threat of enforcement does. Using a difference-in-differences (DiD) approach, we observe a sudden and significant FPIs' market withdrawal following the *MAT threat date*. The withdrawal is also economically material; for a typical treatment firm (those likely to be severely affected), the daily withdrawal is around Indian Rupees (INR) 5.81m (US$ 91,941.38) in the immediate period following the *MAT threat date*.

Our findings also indicate significant adverse implications of FPIs' withdrawal on the Indian stock market, including increased stock market volatility and material negative effects on stock liquidity. Specifically, we find that stock volatility (realized and implied) and the volatility risk premium (VRP) increase significantly during the *post-MAT threat* period, suggesting a significant surge in the market risk premium. We also find a sizeable fall in the turnover ratio (proxy of stock liquidity measure) and escalation in stock illiquidity measures.

Finally, our results demonstrate a prolonged impact of the tax uncertainty caused by the MAT enforcement threat on FPIs. We find no immediate or substantial inflows by FPIs following the *uncertainty resolution date* compared to the sudden and economically considerable outflows after the MAT enforcement threat.

Our paper makes three key contributions. First, our study adds to the growing literature on the impact of taxation issues (Battisti and Deakins, 2018; Glaister and Hughes, 2008; Tuck, 2013). The literature notes a lack of credible studies on tax policy uncertainty. For example, Fleckenstein, Gandhi and Gao (2020 p. 1) note "*A voluminous literature studies the effect of tax levels on financial markets and concludes that it is of first-order importance. The literature on tax policy uncertainty, however, is more limited. In fact, there is little guidance on how tax policy uncertainty should even be measured and the magnitude of its effect, if any, on financial markets.*" Thus, our study fills this void by demonstrating how tax policy changes and the associated uncertainties in emerging markets, result in significant negative trading reactions by FPIs. Desai and Dharmapala (2009) also examine how taxes affect FPI flow, but our paper has significant differences. First, we provide evidence on the average economic effect of two differential FPIs' trading reactions in response to two tax policy uncertainty shocks (i.e. threat and resolution). More importantly, we examine FPIs' immediate financial market implications of the withdrawal that potentially compels policymakers to reverse the threat.

Second, we extend the growing debate on whether tax subsidies are important for FPIs, particularly in the context of emerging markets where information asymmetry problems are acute. For example, Razin, Sadka and Yuen (1998) suggest that FPIs, being mobile investors, have the choice of not investing in costly information gathering as they can yield a real rate of return elsewhere that, at least in theory, is identical to that obtained in the host market. As such, this high cost of information acquisition could lead to a suboptimal supply of foreign capital. However, by providing tax subsidies and certainty in tax treatment, policymakers could provide benefits that effectively reduce the net costs associated with the information asymmetry problem. In this study, we argue that when a tax subsidy is threatened FPIs react negatively, leading to disruptive market effects.

Finally, we add to the literature on the role of FPIs in influencing policymaking in emerging markets (Durnev *et al*., 2015; Kerner, 2015). To the best of our knowledge, this is the first study to show a direct market-based channel through which FPIs can pressure government policymaking. This highlights the importance of FPIs to emerging markets and supports the view that FPIs provide benefits to these markets and that regulators formulate policies to retain FPIs' investments (Errunza, 2001; Leuz, Lins and Warnock, 2009)

Minimum alternate tax

Since the liberalization of the Indian economy in the early 1990s, FPIs have actively participated in the Indian financial market. At the same time, FPIs have also received significant concessions, including exemption from long-term capital gains tax. Although FPIs are liable to pay a short-term capital gains tax of 15%, anecdotal evidence suggests that most FPIs completely avoid paying any taxes by taking advantage of India's double-taxation treaty agreement (DTTA) with other countries. By setting up holding companies ("treaty shops") in countries such as Mauritius, Singapore, and Hong Kong, which enjoy tax exemption status with India, FPIs have generally avoided capital gains taxation.[2]

[2] The annual report for 2015/16, published by the Securities Exchange Board of India (SEBI), shows foreign portfolio investments from Mauritius (US$ 6bn), Singapore (US$ 38bn) and Luxembourg (US$ 2bn) had the highest value of assets under custody during 2015/16 after the US (US$ 10bn).

To curb these tax avoidance practices, the Indian government proposed an alternative tax mechanism on FPIs, referred to as MAT, as early as 2000. The idea of MAT was to ensure that "zero-tax companies", including FPIs, pay at least 18.5% tax on their net profit. However, despite several attempts, FPIs were largely able to avoid any MAT liability, particularly those that did not have any permanent establishment in India. Without clear guidelines, there has been significant policy uncertainty since 2000 on the applicability of MAT to FPIs' transactions.

The situation changed markedly in early 2015. In his budget address on 28th February 2015, the Indian finance minister announced that FPIs would no longer be liable for MAT for all future transactions from 1st April 2015. While this announcement cleared FPIs of any future tax liability, there was still significant uncertainty around MAT liability for past transactions. The tax uncertainty escalated when the ITD issued assessment orders for past MAT liability for several FPIs towards the end of March (Dave, 2015a,b).[3] The financial press reported that close to 100 FPIs had received such tax notices by 21st March 2015 (The Times of India, 2015). The Indian government emphasized the tax threat by announcing a plan to raise US$ 6.4bn in the form of MAT from FPIs on all transactions made before the effective date of 1st April 2015 (Crabtree, 2015a,b; Nayyar, 2015; The Times of India, 2015; Zachariah, 2015). This event was important as, for the first time, FPIs in India were issued with notices for their MAT liability. Given the severity of the issue, several FPIs approached the dispute resolution panel of the ITD and six FPIs filed a writ petition before the Bombay High Court. Consequently, a high-level committee was formed to address the concerns raised by FPIs. In line with the

[3] ITD had sent notices to a select number of FPIs in prior years as well. However, the notices sent during September 2014 and January 2015 were only show-cause notices. These show-cause notices are not an indictment and demand for paying taxes, but only seeking explanation as to why MAT is not applicable to FPIs. For example, see the following link: https://economictimes.indiatimes.com/markets/stocks/news/tax-department-issues-show-cause-notices-to-over-35-foreign-portfolio-investors/articleshow/45846568.cms?from=mdr

recommendations of this committee, the Indian government announced on 1st September 2015 that MAT would not be imposed on FPIs retrospectively.

Therefore, the focus of our study is to investigate FPIs' behaviour around the two key dates: 21st March 2015 and 1st September 2015. First, the assessment orders sent out towards the end of March created a great deal of tax uncertainty and potential deadweight cost for FPIs. More importantly, the issuance of assessment orders was the first enforcement action by Indian regulators on MAT, and accordingly, we refer to this date as the *MAT threat date*. For our empirical analysis, we denote the period before 21st March 2015 as *pre-MAT threat* period and the period after 21st March as *post-MAT threat* period. Second, the announcement made on the 1st of September that resolved the policy uncertainty around MAT liability is referred to as the *uncertainty resolution date.* Appendix A provides a summary of the key MAT-related events.

Related literature and hypotheses development

Tax reform and reactions of FPIs

Prior studies, both theoretical and empirical, show that international portfolio investors face significant deadweight costs when investing in foreign markets, ultimately resulting in suboptimal investments (Bekaert and Harvey, 2003). These deadweight costs can stem from a higher degree of information asymmetry, policy uncertainty, political risk, lack of transparency and trust, poor institutional quality, and capital controls such as taxation (Desai and Dharmapala, 2009; Gelos and Wei, 2005; Gauvin, McLoughlin, and Reinhardt, 2014; Guiso, Sapienza, and Zingales, 2009; Julio and Yook, 2012; Portes and Rey, 2005; Wei, 2000). These studies suggest that FPIs are likely to withdraw their investments in the event of encountering potential deadweight costs (Goldstein and Razin, 2006), and this is particularly true in emerging markets where the level of uncertainty is higher. For example, Doca (2012) shows that FPIs pay close attention to the regional developments in emerging markets and their behaviour can be illustrated by "panic" in periods when uncertainty is high.

Among the different barriers to international investments, the most relevant to our paper is the barrier arising from political uncertainty, or more specifically uncertainty related to government policies directed at foreign investments (Bekaert *et al.*, 2014; Brewer, 1993). Relatedly, the ICAPM-based theoretical framework highlights the role of tax – as one of the unique costs/barriers to investing in emerging markets – on the trading behaviour of FPIs (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. Within our context, any such tax policy which creates additional deadweight costs, and hence is not favourable for FPIs' investment, is an example of what is referred to as a non-convergence policy.

The ICAPM implies that if FPIs are made liable to pay tax on retrospective transactions, this would generate significant deadweight costs on their future returns. In our case, although the first announcement did rule out any future taxes, the imposition of taxes on the retrospective transactions became highly probable towards the 21st March 2015. It is generally accepted that any retrospective tax is not welcomed by a tax-paying entity as it creates tax uncertainty (Shome, 2019). This additional tax levy on past transactions, when the legal tax provisions were different, and now must now be paid in the current or future periods creates deadweight costs.

Further, the literature on comparative politics argues that FPIs are themselves able to influence policymaking through their exit strategies, particularly observed through divestment campaigns pursued by university endowments, pension funds, and other influential institutional investors (Kerner, 2015). Economic conjecture dictates that FPIs' policy-influencing power stems from their ability to harm the domestic financial market when they divest, by dampening the value of equity, which in turn escalates the cost of raising future capital (Bekaert and

Harvey, 2003). Therefore, FPIs could use their influence to change Indian government policy on the retrospective tax charge caused by MAT by withdrawing from the Indian market.

Further, the extent of FPIs influence also depends on the level of domestic capital endowments. For instance, several studies argue that the more reliant a country is on foreign capital, the greater will be the need to devise policies to maintain its global reputation as a financially attractive (lower taxes) and politically stable (higher policy stability, including more tax certainty) investment destination (Haggard and Maxfield, 1996; Wibbels and Arce, 2003). In our case, India is materially dependent on mobile capital as FPIs hold almost 40% of the free-float market capitalization of the Indian equity market (Crabtree, 2015c; Merchant, 2014).

Further, even though we investigate FPIs' trading behaviour across several MAT-related announcements, our primary emphasis is on the announcement related to the issuance of assessment orders, i.e. the *MAT threat date*. We focus on this event for two main reasons. First, although the MAT liability was an attempt on the part of the government to tax FPIs, it can be argued, from the FPIs' perspective, that the demand for retrospective tax could have been perceived as a realization of a severe form of political risk – the risk of expropriation through additional taxes (Bekaert *et al.*, 2014; Knudsen, 1974). Second, a large body of literature on regulatory economics highlights the importance of the enforcement mechanism in triggering actions from market participants (Coffee, 2007; Jackson and Roe, 2009). Although primarily discussed in the context of security law and corporate governance, we argue that the significant escalation of the possible enforcement of MAT liability through the issuance of assessment orders is likely to have a more pronounced effect on the behaviour of FPIs.[4] This was the first occasion, since the debate surrounding MAT in early 2000, that FPIs were issued

[4] These arguments are consistent with Kingsley and Graham (2017) who note that FPIs in emerging markets, where there is significant information void, quickly react to new information. Therefore, once an actionable change is detected by FPIs their flexibility allows them to respond very quickly and they can exit the market.

with tax assessment orders. Thus, in the context of barriers to international investments and regulatory economics in emerging markets, we propose the following hypothesis:

H_1: Relative to other MAT-related announcements, FPIs' withdrawal following the MAT threat date should be swift and material.

FPIs' withdrawal and disruptive market implication.

Kaminsky and Reinhart (2001) show that higher stock market volatility in emerging markets is not so much related to economic fundamentals, but rather to financial instability. Higher volatility in emerging markets discourages investor participation, deters risk sharing, distorts investment decisions, and leads to higher cost of capital (Allen and Gale, 1994; Lee, Ng and Swaminathan, 2009). Studies examining issues of stock market liberalization in emerging markets show that stock volatility declines when foreign investors begin to invest in the local stock market (Bekaert and Harvey, 1997, 2000; Kim and Singal, 2000). Errunza (2001) argues that there is no theoretical reason why volatility should increase after liberalization. However, most of these studies analysed data from the pre-1997 period when most of these economies were just opening up their equity markets. When these markets experienced significant destabilizing effects, following the significant FPIs' outflows during the financial crises of late 1998 and early 2000, this view of no link between FPIs' flows and local market volatility became questionable. Further, when countries initially liberalize, the influence of FPIs is deemed to be different when they accumulate sizeable holdings of the local assets and the host markets become highly reliant on their investments.

Two economic explanations have been offered on the positive link between FPIs' outflows and volatility. First, the leverage effect posits that an increase in volatility is higher in falling rather than rising stock markets. Since studies show that sales by FPIs significantly depress the value of local equities (Froot, O'Connell and Seasholes, 2001; Kerner, 2015;

Richards, 2005), we should expect outflows to escalate the local market volatility. Second, Merton (1987) argues that an increase in the investor base should lower a local market's volatility as a larger investor base improves the accuracy of market information. Thus, if FPIs exit the market after the *MAT threat date*, which reduces the investor base, we should expect the opposite effect, i.e. an increase in volatility. Therefore, we propose a positive link between FPIs' outflows after the *MAT threat date* and local market volatility.

H_{2a}: FPIs' outflows after the MAT threat date should increase stock market volatility.

Many studies argue that a greater presence of FPIs in a host market is positively related to stock price, and hence influences lowering the cost of equity capital (Errunza, 2001; Harvey, 2000; Kerner, 2015). With greater FPIs, the local market becomes more integrated with the world capital market and therefore the expected return on local stocks would be increasingly determined by global covariance risk. Since the global market portfolio's volatility is lower than that of local stock markets, we would argue that the expected return on stocks will be lower in the presence of higher volume and numbers of FPIs (Errunza, 2001). Further, the greater presence of FPIs entails a greater demand for information dissemination by corporate firms and the government; this reduces information asymmetry in the overall market. Since a lower level of information asymmetry is positively related to cost of capital, we would expect cost of capital to decline when FPIs increase their holdings of local assets (Merton, 1987); we use stock market liquidity as a proxy for cost of capital. Many studies credibly establish that stock liquidity is inversely related to equity cost of capital, i.e. lower stock market liquidity leads to higher cost of capital (Amihud and Mendelson, 2000; Balakrishnan *et al.*, 2014).[5] Thus, we propose the following hypothesis.

H_{2b}: FPIs' outflows after the MAT threat date should lower stock market liquidity.

Resolution of MAT uncertainty

Prior literature suggests how FPIs should react to the decision by the Indian government to clear FPIs of any MAT liability. First, using the Bacchetta and Van Wincoop (2000) model, one would expect capital flows by FPIs to increase significantly following the government decision. This argument is also consistent with Forbes and Warnock (2012) and Rey (2018), who show that a decrease in uncertainty leads to an increase in capital flows. Moreover, the abandonment of MAT, i.e. removal of any political (expropriation) risk facing foreign investors, should not only encourage past FPIs, but also other foreign investors who were hesitant about investing in India due to potential MAT liability and tax uncertainty. From this perspective, we should expect that the decision in September 2015 by the Indian government to remove MAT liability would increase FPIs' inflows.

However, several studies in the context of political and economic uncertainty suggest that recovery in the post-uncertainty period could be long and gradual. For instance, in examining the link between economic policy uncertainty and corporate investments, Gulen and Ion (2016) show that the negative impact of policy uncertainty persists even after the uncertainty is resolved, as corporate investments take two to three years to return to pre-uncertainty levels. Similarly, using elections as a proxy of political uncertainty both Julio and Yook (2012) and Jens (2017) show that corporate investments do not completely recover after

[5] Stock liquidity (such as Amihud illiquidity) is also used as proxies of stock informativeness in several studies (De Cesari and Huang-Meier, 2015; Ferreira, Ferreira and Raposo, 2011). As such, our liquidity measure also captures the information quality of stock prices.

elections, indicating the gradual and slow recovery in activities following the resolution of uncertainty. Honig (2020) also demonstrates that foreign capital flows are negative before political elections and that the recovery does not occur immediately after the election. Such relatively muted reactions by investors are potentially driven by what is referred to as the "lingering" effect of uncertainty.

In our case, the Indian government's tax uncertainty in dealing with MAT and other retrospective tax-related issues in the past could mean that FPIs are less likely to consider the decision from the Indian government as definitive on the non-imposition of MAT liability on future and retrospective transactions. Such a scenario is a corollary to the lingering effect of uncertainty, which itself generates significant deadweight costs. Thus, from a net deadweight cost perspective because of the lingering effect of uncertainty and the dislike that FPIs have for unpredictability in tax treatment, we argue that FPIs' capital inflows, relative to the outflows of the MAT threat date (21st March 2015) and following the *uncertainty resolution date*, are likely to be slow and gradual. Therefore, we formulate the following hypothesis on FPIs' flows following the resolution of MAT uncertainty:

H_3: After the uncertainty resolution date, FPIs' capital inflows should be gradual and significantly smaller in magnitude relative to the outflows after the MAT threat date.

Data, variables, and summary statistics

Data sources

We use FPIs trade-level data obtained from the SEBI-endorsed National Securities Depository Limited (NSDL) database, which contains details of all FPIs' trades since 1st January 2003. Our empirical analysis is based on the purchase and sale of equities on the National Stock Exchange (NSE) and Bombay Stock Exchange (BSE). We source the firm-level data from the

Prowess database maintained by the Centre for Monitoring Indian Economy. The market level return is constructed using the MSCI India Total Return Index obtained from Thomson Reuters.

Main dependent and control variables

Our main dependent variable is FPIs' daily net equity trading (Bekaert and Harvey, 2002; Froot, O'Connell and Seasholes, 2001; Richards, 2005) calculated in basis points (bps) as:

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

where $\sum(Quantity_{i,t} \times Price_{i,t})$ is the net equity traded on day *t* for equity *i*. $Quantity_{i,t}$ is the number of equities *i* purchased/sold on day *t* at $Price_{i,t}$ (positive figure for purchases and negative for sales). $MCap_{i,t-1}$ is the previous day's market capitalization for equity *i*.

The control variables are defined in Appendix B (correlation matrix is presented in Supplementary Appendix A1) along with their expected sign. We control for an array of "push" and "pull factors" that are especially important for FPIs as they impact their equity trading and return. The "pull factors" include home characteristics such as stock market return (to control for return-chasing behaviour), return volatility, US$/INR (exchange rate) volatility, and real GDP growth rate. The "push factors" include factor external to host economies such as world and emerging market stock returns, one-year US T-bills rate, global VIX returns, and emerging markets' VIX returns.

Summary statistics

We begin with a visual presentation (Figure 1) of net monthly FPIs' equity trading in the years 2010, 2012, and 2015 that corresponds to the key dates related to MAT. These figures are winsorized at the 1st and 99th percentile to attenuate the impact of outliers. In July 2010, the regulator ruled that MAT was not applicable to FPIs, accordingly, we observe an increase in FPIs' investments immediately thereafter (INR 394bn during August-December vs. INR 114bn during January-July). In contrast, the change in FPIs' trading following the August 2012 ruling (FPIs could be liable to MAT) appears to be much less significant, perhaps because the new decision was being contested in the Indian courts.

We observe a much stronger response from FPIs in 2015. Although January-March 2015 witnesses a positive inflow, FPIs' net trading reverses dramatically from April onwards, coinciding with the threat date of 21st March 2015. Relative to a net inflow of INR 196bn (US$ 3.10bn) during January-March, the net FPIs' outflow from April-August is approximately INR 484bn (US$ 7.65bn). This evidence is consistent with the prediction of our hypothesis H_1. It is also noteworthy that FPIs' slow and gradual adjustment to trading following the tax threat removal (September 2015) is also in line with our hypothesis H_3.

[Figure 1 here]

In Table 1, we report descriptive statistics of the key variables and statistics on the market-based variables for the *pre-* and *post-MAT threat date*. We observe a significant decline in stock return of around 0.067% after the *MAT threat date*. Similarly, the *Market return* falls significantly by 0.146% and *Market volatility* increases significantly by nearly 0.071%. As the change in *US$ volatility* (-0.019%), *Real GDP growth rate* (-1.688%), and *US TB rate* (0.061%) are significant, we control for all these factors in our regression analysis.

[Table 1 here]

MAT threat and FPIs' trading

MAT threat: an examination of all relevant dates

We begin by conducting a paired *t*-test for the pre- and post-mean differences in NET_{it} and regression-based analysis around the key dates using different window periods. In addition to using a longer time series (e.g. five months), we also use a smaller window period (e.g. seven trading days) to isolate other confounding factors (Bertrand, Duflo and Mullainathan, 2004). Examining equity trading for a smaller window period provides more credible evidence that the FPIs' reaction is caused, at least partially, by the impending tax threat.

In Panel A.1. of Table 2, we examine the average NET_{it} around 23rd July 2010 for different window periods (from seven trading days up to three months). We observe a statistically significant increase in NET_{it} for all window periods. In Panel A.2., we find a statistically significant decline in NET_{it} for all window periods after 14th August 2012. As the legality of this MAT announcement was challenged in the Supreme Court, the scale of the outflow is relatively small. In Panel A.3., we do not find any significant withdrawal by FPIs following the 28th February 2015 announcement. This result is not surprising, given that the announcement relieved FPIs from any future MAT liability. In Panel A.4., we observe a statistically significant and economically material decline of 0.126 bps in NET_{it} within seven trading days after 21st March 2015. On average, the MAT threat leads to a daily withdrawal of almost INR 2.98m market capitalization per firm.[6] The difference is higher for other window periods. During the full sample period, the daily average withdrawal constitutes around INR 5.60m (US$ 90,103.55) of market capitalization per firm.

[Table 2 here]

In Panel A.5, we also report a similar abrupt outflow of FPIs after the effective date of 1st April 2015. During the full sample, the daily average withdrawal constitutes approximately INR 6.45m market capitalization per firm (US$ 101,991.66). Given that the inflow trend abruptly changed to outflows after 21st March 2015, these results provide support to the theoretical prediction that FPIs withdrew from the market in response to the MAT threat, supporting H_1.

In Panel B, we present the results of the following equation:

[6] Calculated as the mean difference times the market capitalization (0.126bps × 236.80bn). The average market capitalization during the *Seven trading days*, *One month*, *Two months*, *Three months*, and *Full sample period* was around INR 236.80bn, 238.67bn, 237.88bn, 237.33bn and 235.41bn, respectively.

$$NET_{it} = \beta(MAT_t) + \gamma_i + \varepsilon_{it} \quad (2)$$

In Equation (2), MAT_t is the dummy variable that takes the value of one before the key dates ($July_{2010}, August_{2012}, February_{2015}, March_{2015}$ and $April_{2015}$) and zero after the key dates for different window periods. 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 announcements related to MAT. The results are consistent with the univariate analysis and show that the FPIs' outflows observed after the MAT threat are significant, both economically and statistically.[7]

Effect of March 2015 MAT threat: Quasi-experimental approach

Identification of treatment and control group

In this section, we perform a quasi-experimental empirical analysis to address any endogeneity concerns. Using FPIs' total cumulative holdings (TCHs) at the sector level, we first categorize firms into quasi-treatment and control groups.[8] TCHs essentially represent FPIs' stock holdings, which we compute by cumulating the value of net equity trades (value of shares bought minus value of shares sold) from 1st January 2003-21st March 2015. Our rationale for using this approach is that any exogenous shock that would affect trading will have a greater impact in sectors with higher FPIs' holdings. Hence, using sector-level TCHs as of 21st March 2015, *MAT threat date,* we categorize firms in sectors that are in the top tercile of FPIs' holdings as the treatment group and those in the bottom tercile as the control group.[9] Figure 2 presents the weekly trend in TCHs for the treatment and control groups for periods before and after the *MAT threat date*.

[7] We also examine the effect of key dates including control variables and find consistent results. The results are available in Supplementary Appendix A2.
[8] We use two digits classifications of the National Industry Classification of India.
[9] We also use alternative treatment and control group using median as a cut-off. The results are presented in Supplementary Appendix A3.

[Figure 2 here]

As shown in Figure 2, firms in the treatment and control groups exhibit, more or less, a common trend in the weekly TCHs before the *MAT threat date,* strongly indicating a parallel trend, which is critical for our DiD approach. However, we observe a significant fall in the TCHs of treatment firms relative to the control firms following the *MAT threat date* (week 12 Figure 2). This fall in TCHs captures the significant drop in NET_{it} of treatment group firms, relative to control group firms. Furthermore, following Bertrand and Mullainathan (2003), we also conduct a regression-based analysis to test the parallel trend assumption. We estimate the following equation:

$$NET_{it} = \sum_{k=-1}^{k=-11} \beta_1 (Week^k \times TRMT_i) + X_{i,t-1}\beta_2' + \gamma_i + \delta_t + \varepsilon_{it} \qquad (3)$$

In Equation (3), $Week^k$ is the dummy variable that takes the value of one for each *k* (-1 to -10) weeks before the *MAT threat date* and zero otherwise. $TRMT_i$ is the dummy variable that takes the value of zero for firms in the control group and one for firms in the treatment group. $\boldsymbol{X_{it-1}}$ is a set of control variables. γ_i is the vector of firm dummies controlling for firm fixed effects. We also include time (day) fixed effects (δ_t) to account for time trends. We double-cluster the standard errors at firm and time (day) level. If there is no pre-existing difference between treatment and control firm, we should expect all β_1s to be statistically insignificant. Figure 3 shows all the coefficient estimates (line) and corresponding *t*-statistics (bar). We find that the estimates of all β_1s are statistically insignificant; the highest associated *t*-statistic is marginally above 1.5. This provides further confidence that the results are unlikely to be driven by any non-parallel trend between treatment and control group firms.

[Figure 3 here]

Difference-in-differences analysis

We undertake the DiD examination in two ways.[10] First, we perform a univariate DiD test by examining the mean difference in the NET_{it} for the treatment and control groups before and after the *MAT threat date*. Panel A of Table 3 presents the results of DiD for NET_{it} for the *pre-MAT threat* period (1st January-21st March 2015) and *post-MAT threat* period (21st March-31st August 2015). The mean difference in NET_{it} between the two groups before the *MAT threat date* is statistically insignificant. In contrast, the difference in NET_{it} between the two categories is negative and statistically significant in the *post-MAT threat* period. More importantly, the univariate DiD estimate is a sizeable -0.2054 bps and statistically significant. This translates to a daily loss of approximately INR 4.84m (US$ 76,456.51) of market capitalization for each firm in the treatment group.

[Table 3 here]

Second, we conduct multivariate DiD tests using different specifications of the following general equation for different window periods:

$$NET_{it} = \beta_1(MAT\ effect_t \times TRMT_i) + \boldsymbol{X}_{it-1}\boldsymbol{\beta}'_2 + \gamma_i + \delta_t + \varepsilon_{it} \tag{4}$$

In Equation (4), $MAT\ effect_t$ is the dummy variable that takes the value of zero in the *pre-MAT threat* period and one in the *post-MAT threat* period for different window periods (see Table 2). All other variables are as defined in Equation (3). The term β_1, which captures the DiD effect, relates to a change in NET_{it} for the treatment firms relative to a corresponding change for the control firms after the *MAT threat date*.[11]

The estimates in Panel B of Table 3 provide evidence consistent with our hypothesis

[10] The use of the DiD approach, to a considerable extent, takes account of the heterogeneous expectation in both the treated and control groups, thus significantly mitigating the issue of selection/omitted variable bias at the investor level.

[11] The results are similar when using industry fixed effects.

H_1. Our main variable of interest, $MAT\ effect_t \times TRMT_i$, is generally statistically significant at 1%. The statistically significant estimate of -0.247 (full sample period specification) indicates that treatment firms' equities are sold more by FPIs relative to the control group firms. In economic terms, the estimate translates to a daily loss of approximately INR 5.81m (US$ 91,941.38) of market capitalization for firms in the treatment group.[12]

For the control variables, we find strong support for the return-chasing behaviour/momentum trading suggesting that FPIs exploit firm-level recent returns to extract information about future returns. The negative impact of market volatility and exchange rate volatility on NET_{it} is consistent with Ülkü (2015) and Hau and Rey (2006). Further, we find a significant negative influence of the *US TB rate* providing evidence of the significance of global push factors (Ülkü, 2015).

These results hold against several robustness checks. The detailed outcomes and discussions are presented in Appendix C. Among the several tests, we examine whether capital movement during the period of policy uncertainty is limited to FPIs or is also seen among domestic institutional investors (DIIs). To investigate this, we compare the quarterly ownership (% of total share) of DIIs with the quarterly ownership of foreign institutional investors (FIIs) in the *pre*- and *post-MAT threat* periods.[13] We designate the FIIs' investment in a firm as the treatment and that of DIIs as the control group. Our DiD results show a significant decline in the ownership of FIIs compared to DIIs in the *post-MAT threat* period, thereby reinforcing our main results. We also use alternative treatment and control groups based on FPIs' identification. Furthermore, we conduct a false experiment, non-parametric permutation tests,

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[12] We also conduct DiD analysis for our other key dates: 23rd July 2010, 14th August 2012, 28th February 2015, and 1st April 2015. We find a statistically significant DiD coefficient of 0.198 for the first key date, a statistically significant coefficient of -0.124 for the second, a statistically insignificant for the third, and a statistically significant coefficient of -0.309 for the fourth date. The results are consistent with our univariate and regression-based findings in Table 2.

[13] FIIs, which excludes foreign individual investors, are dominant investor group (around 75-95%) among FPIs in India (Garg and Dua, 2014).

and address the issue of confounding events and attrition bias. Our results remain robust and supportive of H_1.

Implications of MAT threat and FPIs' withdrawal

Stock volatility

To test hypothesis 2_a we argue that the *realized volatility* (RV) should increase when FPIs withdraw from the market. Similarly, it is also well established that *option-implied volatility* (IV) is often higher than the subsequent RV, as options are priced over their true level of risk (Bakshi and Madan, 2006; Bollerslev, Gibson and Zhou, 2011). These hedging motives suggest that 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). The VRP – defined as the difference between the IV and RV – represents a premium that investors are willing to pay to hold options in their portfolio (Bakshi and Kapadia, 2003). Following this, we argue that when FPIs withdraw from the market, the IV and VRP should also increase. We calculate firm-level RV as the square of daily stock returns. We use the Black and Scholes (1973) formulae to calculate IV (Appendix D).

The results in Panel A of Table 4 demonstrate a statistically significant increase in IV (0.100%), RV (0.057%), and VRP (0.051%) after the *MAT threat date* for the full sample period. Panel B reports the mean DiD of the VRP. The mean DiD is statistically significant at 0.0639% which shows an economically material effect of FPIs' withdrawal on VRP. These results are consistent with hypothesis H_{2a}.

We examine the effect of FPIs' withdrawal by employing different specifications of the following equation:

$$Volatility_{it} = \beta_1(MAT\ effect_t \times TRMT_i \times NET_{it}) + \beta_2(MAT\ effect_t \times TRMT_i) + \beta_3(TRMT_i \times NET_{it}) + \beta_4(MAT\ effect_t \times NET_{it}) + \beta_5(NET_{it}) + \boldsymbol{X}_{it-1}\boldsymbol{\beta}_6' + \gamma_i + \delta_t + \varepsilon_{it} \quad (5)$$

where $Volatility_{it}$ is firm's RV, IV, and VRP. We also include a set of controls ($\boldsymbol{X}_{it-1}$). Empirical evidence suggests that size and liquidity are related to stock return volatility (Bae, Chan and Ng, 2004; Bekaert and Harvey, 1997; Li *et al.*, 2011). Accordingly, we include the log of market capitalization, turnover ratio, and illiquidity index. Following Wei and Zhang (2006) and Li *et al.* (2011), we also include previous day volatility as it is established that return volatility is auto-correlated. Finally, we also include price-to-book ratio as a proxy for firm risk (Chan and Chen, 1991; Fama and French, 1993).

[Table 4 here]

Panel C shows the coefficient of $MAT\ effect_t \times TRMT_i \times NET_{it}$ is negative. Although statistically significant only at the 10% level, there is a clear indication that FPIs' departure following the *MAT threat date* increases stock RV. Our estimations are statistically and economically stronger for option-based volatility measures. We find that one bps decline in NET_{it} increases the IV by 0.093%, RV by 0.057% and VRP by 0.041%. Taken together, these results imply that after the FPIs' withdrawal after the *MAT threat date* significantly increases stock volatility, supporting hypothesis 2_a.

Stock liquidity

Next, we examine how changes in FPIs' trading may trigger changes in stock market liquidity, a proxy for cost of capital. We use three different measures of stock liquidity: turnover ratio, Amihud (2002) illiquidity index, and Hui and Heubel (1984) liquidity ratio (see Appendix D).

In Panel A.1 of Table 5, we observe a statistically significant and material decline in *Turnover ratio* throughout the *MAT threat* period. In Panel A.2, we see an economically material and statistically significant rise in the *Illiquidity index*. Finally, Panel A.3 also shows an economically sizeable increase in the *Liquidity ratio* (where a higher *Liquidity ratio* suggests lower liquidity); all are statistically significant. In Panel B, the DiD estimates of all three liquidity proxies are also statistically significant at the 1% level. Overall, these results are consistent with hypothesis H_{2b}.

[Table 5 here]

We also test the impact on liquidity by running different specifications of the following equation:

$$\begin{aligned} Liquidity_{it} = {} & \beta_1(MAT\ effect_t \times TRMT_i \times NET_{it}) + \beta_2(MAT\ effect_t \times TRMT_i) \\ & + \beta_3(TRMT_i \times NET_{it}) + \beta_4(MAT\ effect_t \times NET_{it}) + \beta_5(NET_{it}) \\ & + \boldsymbol{X}_{it-1}\boldsymbol{\beta}'_6 + \gamma_i + \delta_t + \varepsilon_{it} \end{aligned} \tag{6}$$

where $Liquidity_{it}$ is a measure of stock market liquidity. $\boldsymbol{X}_{it-1}$ is a set of control variables that affect liquidity.[14] The results are presented in Panel C. Model 1 indicates that the reduction in NET_{it}, during the *post-MAT threat* period, affects the stock turnover ratio negatively. Economically, a one bps decline in NET_{it} leads to a 0.019% decline in *Turnover ratio*. Model 2 shows that the FPIs' withdrawal increases illiquidity, with a one bps decline in NET_{it} triggering a 0.017 point increase in the *Illiquidity index*. Finally, model 3 suggests that FPIs' withdrawal reduces liquidity (higher value suggests lower liquidity) with a one bps decline in NET_{it} resulting in a 1.372 point increase in the *Liquidity ratio*. Overall, our evidence clearly shows that FPIs' withdrawal after the *MAT threat date* reduces the market liquidity of the treated firms, relative to the control group firms, supporting hypothesis 2_b. Based on the

[14] Studies suggest that firm and stock trading characteristics are the most common factors influencing stock liquidity (Chordia, Roll and Subrahmanyam, 2000; Stoll, 2000;Lesmond, 2005).

arguments of Amihud and Mendelson (2000) and Balakrishnan *et al.* (2014), this implies an increase in the cost of capital for Indian firms.

MAT threat reversal

In this section, we examine FPIs' trading following the elimination of the MAT threat in 1st September 2015, *uncertainty resolution date*. The full sample period ranges from 21st March – 31st December 2015. The results are reported in Table 6.

[Table 6 here]

The results show that FPIs' trading flows remain negative even after the *uncertainty resolution date*, although the magnitude of the outflow is relatively smaller, as evident from the positive mean differences. Generally, this is consistent with the argument that the fall in the magnitude of the tax barrier (deadweight costs) to international investments should lead to more efficient allocations. 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 a sudden and/or material inflow of FPIs, rather the pace of the investment outflow reduces. To further substantiate these results, we run different specifications of the following DiD equation:

$$NET_{it} = \beta_1(MAT\ reversal\ effect_t \times TRMT_i) + \boldsymbol{X}_{it-1}\boldsymbol{\beta}'_2 + \gamma_i + \delta_t + \varepsilon_{it} \qquad (7)$$

where $MAT\ reversal\ effect_t$ is the dummy variable that takes the value of zero in the *post-MAT threat* period, and the value of one for the *uncertainty resolution period* for different window periods. The results in Panel B of Table 6 show the coefficients of the main variable of interest are positive but not statistically significant.

For the full sample period, the DiD coefficient β_1 shows an increase of only 0.043 bps, which is significantly smaller in magnitude compared to the 0.247 bps decline reported in the withdrawal regression (Table 3). Economically, this 0.043 bps translates to a small daily increase of INR 1m market capitalization for each equity, compared to a larger daily withdrawal of INR 5.81m during the initial announcement. These results suggest that although FPIs swiftly leave the Indian market when facing the threat of unfavourable tax policies, the reversal of the tax threat does not lead to a sudden and equally substantial inflow of FPIs, supporting hypothesis H_3.

Conclusion

FPIs play an important role in supplying funding and liquidity in capital-constrained emerging markets, which motivates policymakers to attract and retain their investments. Given their importance, the literature suggests that FPIs can indirectly influence policymaking through their ability to pressurize shareholders and managers of firms. However, we argue that when policy changes of the host government are detrimental, FPIs could also directly influence government policy by withdrawing from the host market, which causes disruptive effects in the stock market. We exploit an unexpected announcement in tax policy (known as MAT), that threatened to impose retrospective taxes on FPIs, to not only examine FPIs' reaction in response to the threat of impending taxes but also to consider the implications of market withdrawal by FPIs.

Our economic arguments predict that the trading reactions (entry and exit) of FPIs not only depend on the severity and credibility of the tax reforms, but also on FPIs' ability to harm the host capital market. Thus, FPIs may quickly and materially exit the host capital market in response to tax policy reforms that are not in their interest. Further, given FPIs' experience and the questionable credibility of a host country's reforms, FPIs may not re-enter the market with the same speed and volume once the tax threat has been removed. We find the MAT threat leads to a swift and economically significant market withdrawal by FPIs. This dramatic response of FPIs to exit the market also has disruptive effects on stock liquidity and volatility. These effects, driven by a sudden and unexpected outflow of FPIs, could have played a key role in coercing 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 sudden and materially substantive inflows, compared to the exit reaction.

To conclude, our study implies that tax advantage is one of the important attractions for FPIs in emerging markets. FPIs seem to be sensitive to tax policies and any change that increases their explicit tax liability may result in severe withdrawal of funds, instigating severe negative stock market implications. Although FPIs 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 if policymakers in emerging markets aspire to attract and retain FPIs, they may wish to take due care in formulating, announcing, and implementing policies that could have a direct effect on the expected payoff of FPIs.

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Table 1. Descriptive statistics of control variables

	Sample mean	Sample median	Sample SD	Mean: Pre-MAT threat (1)	Mean: Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Stock return (%)	-0.023	-0.060	2.837	0.020	-0.047	-0.067***	-7.761	0.009
Market return (%)	-0.020	0.009	1.083	0.078	-0.068	-0.146***	-2.462	0.060
Market volatility (%)	0.967	0.969	0.082	0.911	0.983	0.071***	3.125	0.023
US$ volatility (%)	0.311	0.320	0.021	0.324	0.305	-0.019***	-6.040	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	0.014	-0.158	-0.172	-1.064	0.162
World return (%)	-0.017	-0.005	0.796	0.032	-0.041	-0.072	-0.547	0.132
US TB rate (%)	0.262	0.250	0.056	0.221	0.282	0.061***	7.655	0.008
EM VIX return (%)	0.354	-0.547	8.006	-0.123	0.514	0.637	0.369	1.726
Global VIX return (%)	0.208	-0.107	8.864	-0.233	0.421	0.654	0.444	1.472

Note: This table shows the overall summary statistics of control variables used in this study. The definition of the control variables and their sources is discussed in Appendix B. *Pre-MAT threat* period is the period before the *MAT threat date* (1st January-21st March 2015) and *Post-MAT threat* period is the period after the *MAT threat date* (21st March-31st August 2015). *Difference* shows the difference between *Post-* and *Pre*-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. *Post – Pre* average <0). The corresponding standard errors *(Std. error)* are also reported. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

Table 2. Net equity trading for different window periods

Panel A: Univariate statistics

A.1. 23rd July 2010

Window period	Pre (1)	Post (2)	Diff (2) - (1)	*t*-stat	Std. error	Observations
Seven trading days	0.266	0.399	0.133***	2.812	0.047	8,108
One month	0.287	0.444	0.157**	2.693	0.058	24,591
Two months	0.231	0.383	0.152***	4.191	0.036	48,377
Three months	0.219	0.510	0.291***	3.131	0.093	73,250

A.2. 14th August 2012

Window period	Pre (1)	Post (2)	Diff (2) - (1)	*t*-stat	Std. error	Observations
Seven trading days	0.358	0.217	-0.141***	-2.872	0.049	8,978
One month	0.140	-0.136	-0.276***	-4.231	0.065	26,845
Two months	0.160	-0.018	-0.178***	-3.113	0.057	48,478
Three months	0.157	-0.023	-0.180***	-2.990	0.060	69,015

A.3. 28th February 2015

Window period	Pre (1)	Post (2)	Difference (2) - (1)	*t*-stat	Std. error	Observations
Seven trading days	0.362	0.394	0.033	0.540	0.060	9,446
One month	0.375	0.387	0.012	0.448	0.030	28,248
Two months	0.212	0.214	0.002	0.941	0.002	55,453
Three months	0.197	0.156	-0.041**	-1.992	0.021	84,003

A.4. 21st March 2015

Window period	Pre (1)	Post (2)	Difference (2) - (1)	*t*-stat	Std. error	Observations
Seven trading days	0.527	0.401	-0.126***	-2.61	0.048	9,982
One month	0.396	0.175	-0.221***	-6.58	0.033	28,822
Two months	0.282	0.079	-0.203***	-8.50	0.024	55,996
Three months	0.194	-0.013	-0.207***	-8.00	0.020	85,093
Full sample period	0.212	-0.026	-0.238***	-13.04	0.018	116,870

A.4. 1st April 2015

Window period	Pre (1)	Post (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
Full sample period	0.225	-0.049	-0.274***	-15.404	0.018	116,870

Panel B: Regression coefficients

	Seven trading days	One month	Two months	Three months	Full sample period
$July_{2010}$	0.024**	0.088**	0.144*	0.197***	
	(2.11)	(2.05)	(1.77)	(3.97)	
$August_{2012}$	-0.108***	-0.112**	-0.138	0.082	
	(-3.01)	(-2.44)	(-1.30)	(0.03)	
$February_{2015}$	0.016	0.012	0.033	-0.044	
	(1.19)	(1.22)	(0.73)	(-1.10)	
$March_{2015}$	-0.182***	-0.257***	-0.285***	-0.257***	-0.328***
	(-2.68)	(-4.85)	(-5.98)	(-5.79)	(-7.53)
$April_{2015}$	-0.238***	-0.396***	-0.314***	-0.325***	-0.354***
	(-3.36)	(-6.81)	(-6.20)	(-6.86)	(-8.05)

Note: Panel A shows the paired *t*-test of the differences in average daily net equity trading (NET_{it}) as a percentage of previous day market capitalization (reported in bps units) of listed stocks in BSE/NSE by all FPIs following each key date. For *Seven trading days*, we use seven trading days' data before key dates and seven trading days' data after key dates. The case for the *One month, Two months,* and *Three months* window periods is similar. The *Full sample period* ranges from 1st January 2015-31st August 2015. Panel B reports the coefficient estimates of the following regression specification for different window periods:

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

MAT_t is the dummy variable that takes the value of one before the key dates: and zero after the key dates for different window periods. 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.

Table 3. Difference-in-differences for key date: 21st March 2015

Panel A: Firm-level difference-in-differences analysis

	Pre-MAT threat (1)	Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Treatment	0.2033	-0.0509	-0.2542***	-11.97	0.021
Control	0.1547	0.1059	-0.0488	-1.42	0.034
Difference (Pre-MAT)	0.0486			0.946	0.051
Difference (MAT)		-0.1568***		-3.961	0.040
Difference-in-differences			-0.2054***	-2.941	0.070

Panel B: Different periods-based difference-in-differences regressions

	Seven trading days	One month	Two months	Three months	Full sample period	Full sample period
$MAT\ effect_t \times TRMT_i$	-0.183**	-0.245***	-0.281***	-0.280***	-0.330***	-0.247***
	(-2.24)	(-3.83)	(-4.92)	(-5.36)	(-6.52)	(-3.68)
Stock return						0.065***
						(9.83)
Market return						-0.026
						(-0.86)
Market volatility						-0.632**
						(-2.24)
US$ volatility						-5.129**
						(-2.42)
Real GDP growth rate						0.005
						(0.43)
World return						-0.028
						(-0.28)
EM return						0.346*
						(1.83)
US TB rate						-2.871***
						(-3.15)
EM VIX return						0.007
						(1.21)
Global VIX return						-0.009
						(-1.45)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time (day) fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.342	0.225	0.180	0.149	0.128	0.133
Number of firms	549	662	741	785	863	855
Number of observations	8,324	24,326	47,228	71,801	98,757	96,614

Note: 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 the *pre-MAT threat* period (1st January-21st March 2015) and *post-MAT threat* period (21st March-31st August 2015). Panel B reports the results of the following regression specification for different window periods:

$$NET_{it} = \beta_1(MAT\ effect_t \times TRMT_i) + \boldsymbol{X}_{it-1}\boldsymbol{\beta}'_2 + \gamma_i + \delta_t + \varepsilon_{it}$$

where $MAT\ effect_t$ is the dummy variable that takes the value of zero in the *pre-MAT threat* period and one in the *post-MAT threat* period for seven trading days, one month, two months, three months, and the full sample period. $TRMT_i$ is the dummy variable that takes the value of zero for the control group and one for the treatment group. $\boldsymbol{X}_{it-1}$ is the vector of control variables defined in Appendix B. γ_i is the vector of firm dummies controlling for firm fixed effects. δ_t controls the 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.

Table 4. Implications of FPIs' withdrawal on stock volatility

Panel A: Mean differences in stock volatility

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

Window period	Pre-MAT threat (1)	Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	2.555	2.653	0.098***	23.339	0.004
One month	2.613	2.715	0.102***	25.837	0.004
Two months	2.792	2.794	0.142***	11.661	0.012
Three months	2.762	2.783	0.143***	11.760	0.012
Full sample period	2.762	2.810	0.100***	18.519	0.005

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

Window period	Pre-MAT threat (1)	Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	1.947	1.983	0.036***	7.936	0.005
One month	2.013	2.088	0.074***	5.639	0.013
Two months	2.089	2.189	0.100***	5.072	0.020
Three months	2.041	2.174	0.133***	6.002	0.022
Full sample period	2.041	2.098	0.057***	2.925	0.020

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

Window period	Pre-MAT threat (1)	Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	0.607	0.669	0.062***	15.499	0.004
One month	0.615	0.701	0.086***	15.118	0.006
Two months	0.605	0.703	0.099***	13.587	0.007
Three months	0.701	0.809	0.108***	12.061	0.009
Full sample period	0.701	0.751	0.051***	9.013	0.006

Panel B: Mean difference-in-differences in volatility risk premium (in %)

	Pre-MAT threat (1)	Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Treatment	0.7211	0.7912	0.0701***	9.407	0.007
Control	0.7201	0.7263	0.0062	1.355	0.005
Difference	0.0010			0.629	0.002
Difference		0.0649***		3.355	0.019
Difference-in-differences			0.0639***	2.721	0.023

Panel C: Regression analysis of implications for stock volatility

	Overall realized volatility (1)	Option-based volatility measures: Implied volatility (2)	Realized volatility (3)	Volatility risk premium (4)
$MAT\ effect_t \times TRMT_i \times NET_{it}$	-0.028*	-0.093***	-0.057***	-0.041**
	(-1.92)	(-4.27)	(-3.97)	(-2.48)
Volatility	8.354**	4.516***	5.389*	5.760***
	(2.33)	(2.91)	(1.89)	(5.05)
Turnover ratio	8.813***	1.987*	2.762***	2.166***
	(4.19)	(1.99)	(3.54)	(3.03)
Market capitalization	-0.079	-0.149*	-0.113*	-0.067**
	(-0.16)	(-1.80)	(-1.82)	(-2.57)
Price-to-book ratio	0.024	-0.003	-0.004	-0.007
	(0.37)	(-0.67)	(-1.42)	(-1.61)
Illiquidity index	95.231*	84.744***	81.691***	18.331
	(1.88)	(2.82)	(3.63)	(1.24)
Firm fixed effects	Yes	Yes	Yes	Yes
Time (day) fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.173	0.161	0.260	0.160
Number of firms	753	106	106	106
Number of observations	81,580	15,280	15,280	15,280

Note: Panel A presents the mean differences in *Option-implied volatility (IV)*, *Realized volatility (RV)*, and *Volatility risk premium (VRP)* for the different window periods surrounding the key date 21st March 2015. 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 (1st January-21st March 2015) and the *post-MAT threat* period (21st March 2015-31st August 2015). Panel C reports the regression results of the following regression specification:

$$Volatility_{it} = \beta_1(MAT\ effect_t \times TRMT_i \times NET_{it}) + \beta_2(MAT\ effect_t \times TRMT_i) + \beta_3(TRMT_i \times NET_{it}) + \beta_4(MAT\ effect_t \times NET_{it}) + \beta_5(NET_{it}) + \boldsymbol{X}_{it-1}\boldsymbol{\beta}_6' + \gamma_i + \delta_t + \varepsilon_{it}$$

where $Volatility_{it}$ is three different measures of volatility: *IV*, *RV*, and *VRP*. Variables are defined in the notes to Table 3 and Appendix B. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

Table 5. Effects of FPIs' withdrawal on stock liquidity

Panel A: Mean differences in stock liquidity

A.1. Turnover ratio (in %)

Window period	Pre-MAT threat (1)	Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	0.225	0.197	-0.028***	-4.184	0.007
One month	0.221	0.218	-0.003	-1.176	0.002
Two months	0.210	0.180	-0.030***	-9.921	0.003
Three months	0.206	0.173	-0.034***	-13.440	0.003
Full sample period	0.206	0.187	-0.019***	-6.443	0.003

A.2. Illiquidity index

Window period	Pre-MAT threat (1)	Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	0.507	0.517	0.010***	3.385	0.003
One month	0.531	0.572	0.042***	3.850	0.011
Two months	0.517	0.574	0.056***	8.177	0.007
Three months	0.494	0.597	0.103***	13.144	0.008
Full sample period	0.494	0.572	0.078***	10.982	0.007

A.3. Liquidity ratio

Window period	Pre-MAT threat (1)	Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Seven trading days	17.651	18.174	0.523***	2.821	0.185
One month	18.105	18.882	0.778***	3.677	0.212
Two months	17.189	19.213	2.024***	7.895	0.256
Three months	17.128	19.991	2.862***	12.522	0.229
Full sample period	17.128	19.497	2.369***	6.453	0.367

Panel B: Mean difference-in-differences in stock liquidity

B.1. Turnover ratio (in %)

	Pre-MAT threat (1)	Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Treatment	0.216	0.182	-0.034***	-3.628	0.009
Control	0.213	0.204	-0.009	-0.716	0.013
Difference (Pre-MAT)	0.003			0.946	0.002
Difference (MAT)		-0.022***		-6.925	0.003
Difference-in-Differences			-0.025***	-3.823	0.006

B.2. Illiquidity index

	Pre-MAT threat (1)	Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Treatment	0.360	0.502	0.142***	8.408	0.017
Control	0.341	0.418	0.076	0.982	0.078
Difference (Pre-MAT)	0.019			0.872	0.021
Difference (MAT)		0.084***		4.511	0.019
Difference-in-Differences			0.066***	3.523	0.019

B.3. Liquidity ratio

	Pre-MAT threat (1)	Post-MAT threat (2)	Difference (2) - (1)	*t*-stat	Std. error
Treatment	17.455	21.602	4.147***	5.248	0.790
Control	18.564	19.460	0.896	0.818	1.096
Difference (Pre-MAT)	-1.109			-0.656	1.690
Difference (MAT)		2.141***		3.161	0.678
Difference-in-Differences			3.251***	5.528	0.588

Panel C: Regression analysis of implications for stock liquidity

	Turnover ratio	Illiquidity index	Liquidity ratio
	(1)	(2)	(3)
$MAT\ effect_t \times TRMT_i \times NET_{it}$	0.019**	-0.017***	1.372**
	(2.21)	(-3.41)	(2.56)
Volatility	-0.073***	0.803***	1.794***
	(-4.71)	(7.31)	(4.20)
Price	-0.0139	0.278***	0.955**
	(-0.54)	(10.98)	(2.70)
Trades	0.008**	-0.363***	-1.071***
	(2.10)	(-20.84)	(-12.35)
Market capitalization	0.099***	-0.547	-3.360***
	(3.04)	(-0.14)	(-7.15)
Absolute return	-0.015***	0.308***	0.642***
	(-5.64)	(17.71)	(17.02)
Firm fixed effects	Yes	Yes	Yes
Time (day) fixed effects	Yes	Yes	Yes
Adjusted R^2	0.631	0.551	0.625
Number of firms	778	778	778
Number of observations	82,684	82,684	82,684

Note: Panel A presents the mean differences in three proxies of stock liquidity for different window periods surrounding the key date 21st March 2015. Liquidity measures are proxied using: (i) *Turnover ratio* (in Panel A.1.); (ii) daily *Illiquidity index* (in Panel A.2.), and (iii) daily *Liquidity ratio* (in Panel A.3.). These measures are discussed in detail in Appendix D. 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 (1st January-21st March 2015) and the *post-MAT threat* period (21st March-31st August 2015). Panel C reports the regression results of the following regression specification:

$$Liquidity_{it} = \beta_1(MAT\ effect_t \times TRMT_i \times NET_{it}) + \beta_2(MAT\ effect_t \times TRMT_i) + \beta_3(TRMT_i \times NET_{it}) + \beta_4(MAT\ effect_t \times NET_{it}) + \beta_5(NET_{it}) + \boldsymbol{X}_{it-1}\boldsymbol{\beta}'_6 + \gamma_i + \delta_t + \varepsilon_{it}$$

where Y_{it} is a vector of different proxies of liquidity measures. Variables are defined in the notes to Table 3 and Appendix B. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

Table 6. MAT enforcement threat reversal and FPIs' market re-entry

Panel A: Mean differences in FPIs' net equity trading following threat reversal

Window period	Post-MAT threat (1)	Uncertainty resolution (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
Full sample period	-0.140	-0.022	0.118***	7.364	0.016	129,659

Panel B: Difference-in-Difference regression results

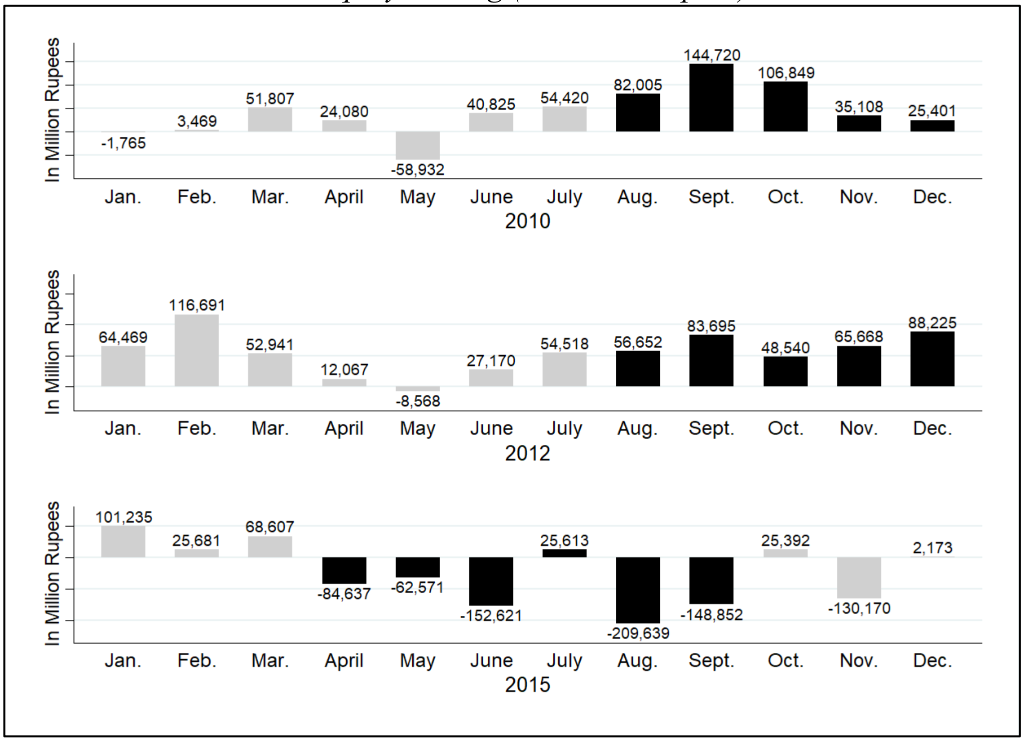
	Seven trading days	One month	Two months	Three months	Full sample period	Full sample period
$MAT\ reversal\ effect_t \times TRMT_i$	0.267 (0.84)	0.0177 (0.13)	0.0614 (0.76)	0.103 (1.57)	0.129 (1.8)	0.043 (0.14)
Stock return						0.061*** (10.58)
Market return						0.008 (0.39)
Market volatility						-0.736** (-2.29)
US$ volatility						-2.389 (-1.13)
Real GDP growth rate						0.021 (1.51)
EM return						-0.075 (-0.20)
World return						0.214 (0.34)
US TB rate						-0.829** (-2.59)
EM VIX return						-0.013** (-2.10)
Global VIX return						0.001 (0.77)
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	0.111
Number of firms	561	683	763	832	895	887
Number of observations	8,543	25,160	50,286	74,758	115,247	112,084

Note: This table shows the impact of MAT policy reversal on FPIs' net equity trading. Panel A shows the paired *t*-test of the differences in average NET_{it}. The *post-MAT threat* period column shows the average value for the corresponding trading window period before the second announcement on MAT reversal (i.e. 1st September 2015) and the *uncertainty resolution* period column shows the average value of the corresponding trading window after the second announcement. Panel B reports the regression results of the following regression specification for different window periods:

$$NET_{it} = \beta_1(MAT\ reversal\ effect_t \times TRMT_i) + \boldsymbol{X}_{it-1}\boldsymbol{\beta}_2' + \gamma_i + \delta_t + \varepsilon_{it}$$

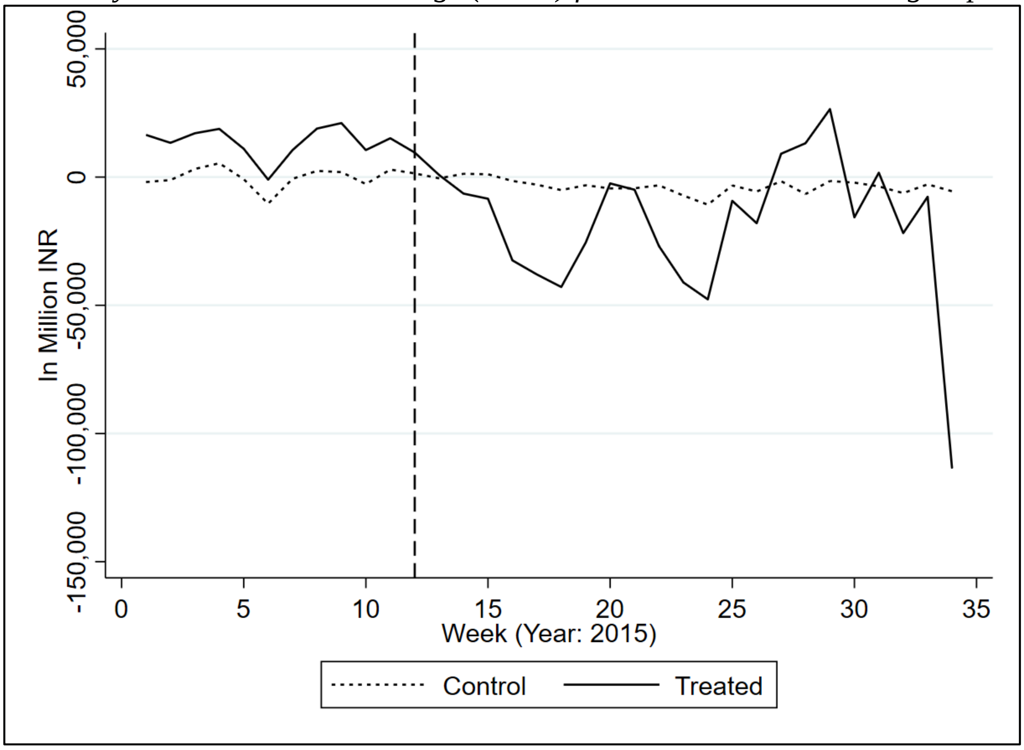
where $MAT\ reversal\ effect_t$ is the dummy variable that takes the value of zero in the *post-enforcement threat* period and one in the *uncertainty resolution* period. Other variables are similar to Table 3 and defined in Appendix B. The *Full sample period* ranges from 21st March 2015-31st December 2015. *, **, and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

Figure 1. Month-wise FPIs' net equity trading (in million rupees)



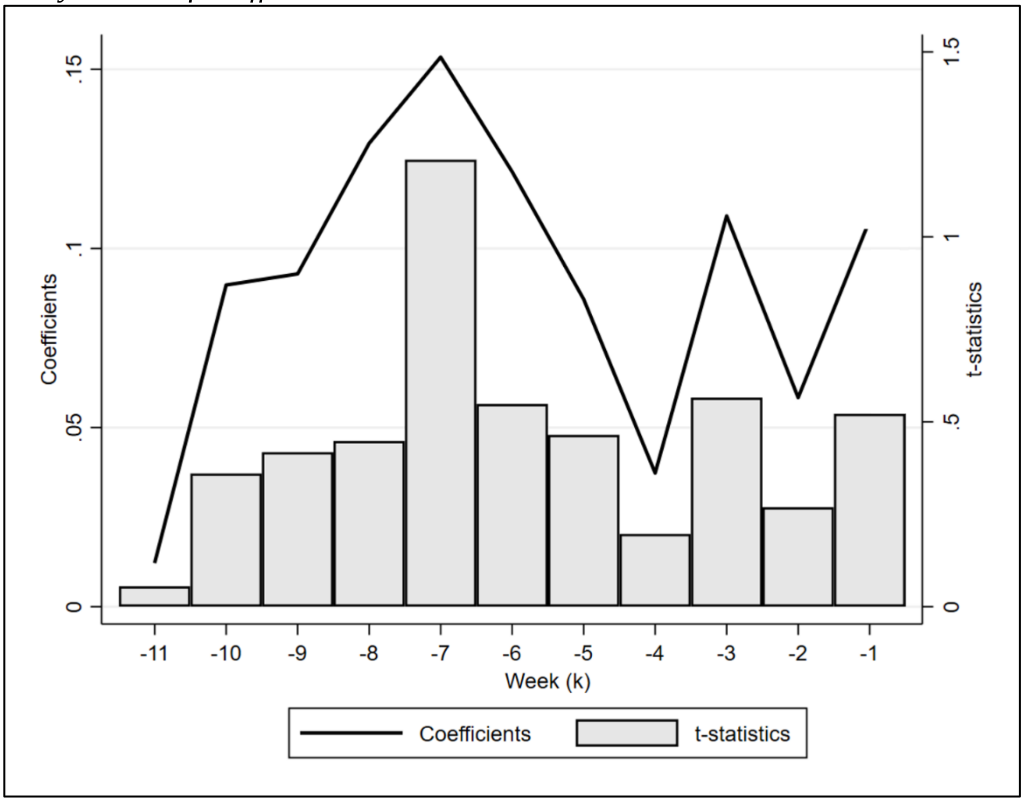
Note: This figure shows the monthly value of net equity trading value by all FPIs during our key years: 2010, 2012 and 2015. The black colour indicates the month after the key date in respective years.

Figure 2. Weekly total cumulative holdings (TCHs) for treatment and control groups



Note: This figure shows the trend in weekly TCHs for the treatment and control groups from 1st January 2015-31st August 2015. The vertical dashed line represents the week (number 12) of the MAT *enforcement threat date* (i.e. 21st March 2015). We calculate TCHs for each sector by all FPIs from 1st January 2003-21st 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.

Figure 3. Dynamics of coefficient estimates



Note: The figure shows the coefficient estimates (line) and corresponding *t*-statistics (bar) from estimating Equation (3) for week *k* before the *MAT threat date* of 21st March 2015.

Appendix

Appendix A. Key dates related to Minimum Alternate Tax (MAT) for FPIs

Dates	Events	Comments
23rd July 2010	Authority for Advance Rulings (AAR) ruled that MAT was not applicable to companies having no permanent establishment in India.	FPIs were not liable to pay MAT in India.
14th August 2012	AAR overruled its previous decision on the applicability of MAT to FPIs.	MAT provisions override Double Taxation Treaty Agreement (DTTA) suggesting FPIs are liable to pay MAT. The ruling did not invoke concerns as the decision was challenged in the Supreme Court.
28th February 2015	The announcement in budget session that MAT would not be imposed w.e.f. 1st April 2015.	Provided relief to FPIs on the applicability of MAT; however, raised the question whether MAT would be imposed retrospectively.
21st March 2015	Tax authorities sent notices to select FPIs demanding MAT payment.	FPIs resort to legal procedures challenging the legality of MAT.
1st April 2015	The effective date of not imposing MAT on prospective transactions.	Provided clarity but more or less made the MAT threat on retrospective transactions imminent.
5th April 2015	Tax demands intensified by Indian government valued at around US$ 6.4bn.	Further increased the threat to FPIs of the new tax liability.
1st September 2015	MAT not to be applicable retrospectively.	Eliminated the MAT threat. End of the issue of application of MAT to FPIs.

Appendix B. Brief description of variables

Variable	Expected sign	Definition	Literature	Data Sources
Main dependent variable				
NET_{it}		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).	Bekaert and Harvey (2002), Froot, O'Connell and Seasholes (2001), Richards (2005)	National Securities Depository Limited (NSDL)
Other dependent variables				
Option-implied volatility (IV)		Volatility measure (in %) calculated using Black and Scholes (1973) options pricing model discussed in Appendix D.	Black and Scholes (1973)	Derived (Appendix D)
Realized volatility (RV) or volatility		Calculated as the square of the previous day's stock returns.	Bakshi and Kapadia, (2003)	Prowess
Volatility risk premium (VRP)		Difference between IV and RV.	Bakshi and Kapadia, (2003)	
Illiquidity index		The daily absolute return of a stock divided by its trading volume on that day.	Amihud (2002).	Derived (Appendix D)
Liquidity ratio		The ratio of the largest price change divided by the ratio of volume to market capitalization.	Hui and Heubel (1984).	Derived (Appendix D)
Main independent variables				
$MAT\ effect_t$	-	The dummy variable that takes the value of zero in the *pre-MAT threat* period and one in the *post-MAT threat* period for different window periods.		
$MAT\ reversal\ effect_t$	+	The dummy variable that takes the value of zero in the *post-MAT threat* period and one in the *uncertainty resolution* period for different window periods.		
$TRMT_i$	-	The dummy variable that takes the value of zero for the control group and one for the treatment group. We calculate total cumulative holdings by all FPIs for each sector from 1st		

		January 2003-21st March 2015 and designate firms in the top tercile sectors as the treatment group and the bottom tercile sectors as the control group.		
Alt_TRMT_i	-	The dummy variable that takes the value of zero for the alternative control group and one for the alternative treatment group identified based on FPIs' identification.		
Main control variables				
Stock return	+	The previous day's return of individual firms that FPIs 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.	Brennan and Cao (1997)	Prowess database maintained by the Centre for Monitoring Indian Economy (CMIE)
Market return	+	The previous day's average return on the NSE and BSE Indexes.	Griffin, Nardari and Stulz (2004)	National Stock Exchange (NSE) and Bombay Stock Exchange (BSE)
Market volatility	-	The daily standard deviation calculated using the previous 90 days' average market return.	Ülkü (2015)	NSE and BSE
US$ volatility	-	The daily standard deviation of the exchange rate using the previous 90 days' figures.	Hau and Rey (2006)	Reserve Bank of India
Real GDP growth rate	+	The last quarter's real gross domestic product growth rate.	Errunza (2001)	Thomson Reuters
EM return	+	The previous day's return on the MSCI Total Emerging Market Index.	Richards (2005)	Thomson Reuters
World return	+	The previous day's return on the MSCI Total World Market Index.	Richards (2005)	Thomson Reuters
US TB rate	-	The previous day's return on the one-year US Treasury Bill rate.	Ülkü (2015), Sarno, Tsiakas and Ulloa (2016)	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 Index.	Richards (2005)	Thomson Reuters
Global VIX return	-	The previous day's return on the Emerging Market Volatility Index.	Fratzscher (2012), Sarno, Tsiakas and Ulloa (2016)	Thomson Reuters

Other control variables for implication analysis			
Turnover ratio	The ratio of the number of shares traded to number of shares outstanding on the previous day.	Bekaert and Harvey, (1997), Bae, Chan and Ng (2004), Li *et al.* (2011)	Prowess
Market capitalization	The log of market capitalization at the end of the previous day.	Li *et al*. (2011)	Prowess
Price-to-book ratio	The ratio of previous day stock price of the firm to previous day book value per share.	Wei and Zhang (2006)	Prowess
Prices	The log of the average price of the stock at the end of the previous day.	Chordia, Roll, and Subrahmanyam (2000), Stoll (2005)	Prowess
Trades	The log of the number of trades during the previous day.	Stoll (2005)	Prowess
Absolute return	The previous day's absolute stock return.	Hasbrouck and Seppi (2001)	Prowess
Previous day volatility	The previous day's volatility	Lesmond (2005); Li *et al*. (2011)	

Appendix C. Robustness tests

Comparison with domestic investors[15]

In our analysis so far, we examine the FPIs' trading after the threat induced by MAT demands. One may question whether flight of capital by FPIs is distinct from domestic investors during the same period; however, there is no access to similar granular trading data for DIIs. As such, in this section, we examine the quarterly ownership of DIIs and foreign institutional investors (FIIs). Our key date (21st March 2015) is just a week before the end of the last quarter (the fiscal year in India ends in March), hence, the tax threat period allows us to compare the ownership of DIIs and FIIs two quarters before and after the *MAT threat date*. For each firm, we source the DIIs' and FIIs' ownership from the Prowess database. We denote the FIIs' ownership in a firm as the treatment groups and the DIIs' ownership in a firm as the control group.

In Panel A, we present mean DiD analysis. The mean DiD shows the difference in the ownership between treatment and control firms in the *post-MAT threat* period compared to the *pre-MAT threat* period. It reveals a significant decline in FII's ownership (treatment group) following the *MAT threat date* whereas there is a significant increase in DII ownership (control group) following the *MAT threat date*. Overall, the mean DiD reveals a significant decline in ownership in the treatment group compared to the control group in the *post-MAT threat* period compared to the *pre-MAT threat* period.

In panel B, we conduct multivariate DiD regression analysis the following equation:

$$Ownership_{jiq} = \beta_1\left(MAT\ effect_q \times TRMT_{ji}\right) + \boldsymbol{X}_{iq-1}\boldsymbol{\beta}_2' + \vartheta_j \times \gamma_i + \delta_q + \varepsilon_{jiq} \qquad \text{(A.1)}$$

In Equation (A.1), $Ownership_{jiq}$ denotes the institutional ownership (DII or FII) in each firm *i* in quarter *q*. $MAT\ effect_q$ is a dummy variable that takes the value of zero for two quarters in the *pre-MAT threat* period and one in the two quarters in the *post-MAT threat*

[15] We thank the reviewer for this suggestion

period. $TRMT_{ji}$ is the dummy variable that takes the value of zero for the control group (DII) and one for the treatment group (FII). $\boldsymbol{X}_{iq-1}$ is the control variable that the literature argues affects the ownership of FIIs and DIIs.[16] ϑ_j is the investor fixed effects and γ_i is the vector of firm dummies controlling for firm fixed effects. We also include year-quarter fixed effects (δ_q) to account for time trends (where indicated). ε_{jiq} is the error term. We double cluster the standard errors at firm × investor and year-quarter level.

The negative DiD coefficients in models 1 and 2 are statistically significant, which shows that compared to the control group the treatment group experienced a significant decline in ownership in the *post-MAT threat* period compared to the *pre-MAT threat* period.

Combined, these results provide confidence in our main results that the threat of MAT liability had a significant impact on FPIs' trading (consequently on FII ownership) leading to flight of capital.

[16] The literature suggests that institutional investors prefer large firms that have lower leverage, high cash holdings, higher return on equity and better current ratio (Dahlquist and Robertsson, 2001; Ferreira and Matos, 2008). 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. Likewise, there is also consensus that institutional investors prefer to invest in younger firms that have higher board independence (Miletkov, Poulsen and Wintoki, 2014; Schnatterly and Johnson, 2014). Therefore, we also include (log of) *Board size*, *Board independence*, and the (log of) *Firm age* as control variables.

Table A1: DII/FII ownership around enforcement threat

Panel A: Mean difference-in-differences

	Pre-enforcement (1)	Post-enforcement (2)	Difference (2) - (1)	*t*-stat	Std. error
Treatment	7.9766	7.3258	-0.6508***	-3.02	0.215
Control	4.2737	4.5722	0.2985***	2.51	0.119
Difference (Pre-MAT)	3.7029***			3.37	1.099
Difference (MAT)		2.7536***		5.87	0.469
Difference-in-Differences			-0.9493***	-2.77	0.343

Panel C: DiD regression analysis

	(1)	(2)
$MAT\ effect_q \times TRMT_{ji}$	-0.528**	-0.659**
	(-3.70)	(-4.23)
Return on equity		0.221*
		(2.40)
Leverage		-0.0166*
		(-2.30)
Cash holdings		1.107
		(1.45)
Firm age		-1.438*
		(-2.57)
Current ratio		0.000
		(0.86)
Board size		-0.115**
		(-2.56)
Board independence		-0.262
		(-0.67)
Market capitalization		0.339***
		(3.59)
Firm × investor fixed effects	Yes	Yes
Year-quarter fixed effects	Yes	Yes
Adjusted R^2	0.628	0.601
Number of firms	2,645	1,870
Number of observations	14,685	10,427

Note: Panel A shows the difference between the differences of treatment and control groups for the average institutional ownership surrounding the *MAT threat date*. The treatment group is the FII and the control group is the DII. Panel B reports the results of the following regression specification:

$$Ownership_{jiq} = \beta_1\left(MAT\ effect_q \times TRMT_{ji}\right) + \boldsymbol{X}_{iq-1}\boldsymbol{\beta}_2' + \vartheta_j \times \gamma_i + \delta_q + \varepsilon_{jiq}$$

The dependent variable is ownership of institutional investor *j* (FII or DII) in firm *i* in quarter *q*. $MAT\ effect_q$ is the dummy variable that takes the value of zero for two quarters in the *pre-MAT threat* period and one for the two quarters in the *post-MAT threat* period. $TRMT_{ji}$ is the dummy variable that takes the value of zero for the control group and one for the treatment group. $\boldsymbol{X}_{it-1}$ is the vector of control variables. ϑ_j controls the investor fixed effects and γ_i is the vector of firm dummies controlling for firm × investor fixed effects. δ_q controls the time (year-quarter) fixed effects. ε_{jiq} is the error term. Standard errors are corrected for clustering at the firm × investor level and time (day). *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level, respectively.

Alternative treatment and control groups using FPIs' identification

We also create treatment and control groups based on the FPIs' unique identification code. Although the public data set provided by NSDL masks the identity of the FPIs, it does provide a unique key (code) for each of them. We first calculate a modified net equity trading measure for each FPI denoted as *j*:

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

where $\sum(Quantity_{j,i,t} \times Price_{j,i,t})$ is the net equity trading on trading day *t* for equity *i* by FPI *j*. Next, we identify the control and treatment groups based on the total cumulative holdings (TCHs) of each FPI (instead of sector as in the original identification) from 1st January 2003-21st March 2015 (sorted based on highest value to lowest). We create treatment and control groups based on terciles (top and bottom terciles) and median (above and below median) TCHs' values respectively. We rerun Equation (4) by replacing NET_{it} by NET_{jit} and include FPI fixed effects in our regression. The results of both specifications (i.e. terciles and median-based), as presented in models 1 and 2 of Table AIV, remain qualitatively similar to the core results in Table 3.

Table A2: Alternate treatment/control group

	FPIs' identification	
	Top/bottom tercile	Median
	(1)	(2)
$MAT\ effect_t \times Alt\_TRMT$	-0.211***	-0.137***
	(-4.24)	(-4.97)
Stock return	0.028***	0.027***
	(3.36)	(3.03)
Market return	-0.018	-0.021
	(-1.34)	(-1.50)
Market volatility	-0.315***	-0.257***
	(-4.81)	(-4.29)
US$ volatility	-0.158	-0.139
	(-1.20)	(-0.97)
Real GDP growth rate	0.005***	0.005***
	(2.69)	(2.46)
EM return	-0.140	-0.123
	(-1.49)	(-1.33)
World return	-0.006	-0.004
	(-1.00)	(-0.81)
US TB rate	-0.983***	-0.921***
	(-5.70)	(-5.80)
EM VIX return	-0.001	-0.001
	(-0.86)	(-0.66)
Global VIX return	-0.001	-0.001
	(-0.56)	(-0.46)
Firm fixed effects	Yes	Yes
Time (quarter/day) fixed effects	Yes	Yes
FPI fixed effects	Yes	Yes
Adjusted R^2	0.145	0.149
Number of firms	1,005	1,038
Number of observations	604,518	651,308

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

$$NET_{it} = \beta_1(MAT\ effect_t \times Alt\_TRMT) + \boldsymbol{X}_{it-1}\boldsymbol{\beta}'_2 + \gamma_i + \delta_t + \vartheta_j + \varepsilon_{it}$$

NET_{it}, $MAT\ effect_t$ and X_{it-1} are defined in the notes to Table 3 and Appendix B. Alt_TRMT_i is the dummy variable that takes the value of zero for the alternative control group and one for the alternative treatment group. In models 1 and 2, the alternative treatment and control groups are based on the FPIs' identification. γ_i is the vector of firm dummies controlling for firm fixed effects. δ_t and ϑ_j control time (quarter/day) and FPI fixed effects, respectively, where indicated. ε_{it} is the error term. Standard errors are corrected for clustering at the firm level, time (quarter/day) level and FPI level where indicated. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

Other robustness tests

We also conduct several other robustness tests to provide further confidence in our support for hypothesis 1_a, but we do not report these findings for brevity. First, we conduct a "false experiment" to rule out the possibility of any cyclical effect. We run a similar specification in Equation (4), modified to assume the occurrence of any non-existent cyclical 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, which lends further confidence that our main results are attributable to the MAT enforcement threat rather than to some other confounding or cyclical factors. Second, a potential candidate for an alternative explanation may result from the possibility of Greece exiting from the Eurozone (Grexit). We find statistically significant and economically similar DiD coefficients even after controlling for the Grexit effect. Third, we check whether our results also hold when we mitigate the issue of attrition bias using a balanced panel data. Fourth, we use median as a cut-off for identification of treatment and control groups instead of top/bottom tercile. These results are presented in Supplementary Appendix A3. Finally, we undertake a non-parametric simulation test for β_1=0 to rule out the persistence of any other confounding effect (Bertrand, Duflo and Mullainathan, 2004). The tests and the results are discussed in Supplementary Appendix A4. Our results are robust to all these additional checks.

Appendix D. 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.[17] Since the call and 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 call and put stock options are collected from the BSE and NSE websites. The call (*c*) and put (*p*) option valuation formulae are:

$$c = S \times N(d_1) - X\, e^{-rT} N(d_2) \text{ and}$$
$$p = X\, e^{-rT} N(-d_2) - S \times N(-d_1) \qquad \text{(A.3)}$$

where

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

where *S* is the current price of the call/put option, *X* is the option's exercise/strike price, *T* is the option's time to expiration, *r* is the risk-free rate of interest and *N*(.) is the normal cumulative density function.[18] Given the price of call and put, we estimate the annualized IV (σ) using the Bisection method with a tolerance level of 0.000001. Daily IVs are calculated by dividing the annualized IV by the root of 252.

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

$$Turnover\ ratio_{it} = \frac{Number\ of\ shares\ traded_{it}}{Number\ of\ shares\ outstanding_{it}} \qquad \text{(A.4)}$$

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

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

[18] We use the 91-days' Indian T-bills rate. The rate is sourced from the Reserve Bank of India (RBI).

$$Illiquidity\ index_{it} = \frac{|R_{it}|}{V_{it}} \tag{A.5}$$

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:

$$Liquidity\ ratio_{it} = \frac{(P_{max} - P_{min})/P_{min}}{V/(S.\bar{P})} \tag{A.6}$$

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.