Policy Information Uncertainty and Trading Behavior of Foreign Institutional Investors

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Abstract

Using transaction-level data and exploiting a credible quasi-natural experiment set-up provided by India's unexpected tax-related policy announcement, we examine the impact of policy-related information uncertainty (PIU) on the trading behaviour of foreign institutional investors (FII). We find that FII reacts quickly and withdraws significant investments during the PIU period. However, the sentiments of the FII turn significantly positive when policymakers eradicate the concerned PIU. The results suggest that policymakers, particularly in capital constraint emerging markets, should be highly conscious of generating PIU if they wish to attract and retain overseas investors.

JEL Classification: G11, G18

Key Words: Policy–related information uncertainty; Foreign institutional investors; Emerging markets; Transaction level data; Quasi–natural experiment

1 Introduction

The information asymmetry (IA) hypothesis, which suggests that foreign institutional investors (FII) are less informed than domestic investors about host–country investments, is currently the dominant economic explanation of the trading behaviour of FII in emerging markets. Since FII are less informed, IA studies argue that these investors primarily seek information from recent asset prices. The IA view thus concludes that the trading of foreign portfolio investors is driven by observed changes in recent asset prices (Brennan and Cao, 1997; Griffin et al., 2004).[1] In this study, we extend the literature by arguing that although the IA–related hypothesis is informative but does not entirely explain the trading behaviour of FII in emerging markets. In this study, we investigate whether policy–related information uncertainty (henceforth PIU) also describes the trading behaviour of FII in emerging markets. We define PIU as the ambiguity associated with the scope and practicalities of implementing unexpected policy announcements by the host government.

We extend the literature on the trading behaviour of FII in emerging markets by investigating how an unexpected and unfavourable policy announcement that creates an ambiguous investment environment explains the trading activities of FII.[2] Studies conjecture

[1] Several empirical studies have investigated the trading behavior of FII in emerging markets, primarily using non–structural dynamic estimations. In this context, by examining the joint dynamics of capital flows and equity returns, particularly in emerging Asian markets, several papers provide strong empirical support for the IA hypothesis in various forms where foreign investors are engaged in positive feedback trading (Bohn and Tesar, 1996; Choe et al., 1999; Stulz, 1999; Froot et al., 2001, Kim and Wei, 2002; Griffin et al., 2004, Richards, 2005). Recently, Ülkü (2015) using emerging European data, also finds evidence of negative feedback trading. Another strand of literature often cites U.S. interest rates as a proxy for world interest rates, and world risk aversion as an important factor of portfolio flows into emerging markets (Chuhan et al., 1998; Ülkü, 2015; Sarno et al., 2016). However, in contrast, Bekaert et al. (2002) do not report any significant effect on capital flows to emerging markets as a result of an unexpected reduction in world interest rates.

[2] The unexpected and unfavorable policy announcement is related to a unique form of political risk for foreign investors. For example, Stulz (2005) argues that for foreign investors' host country characteristics are important because of the risks of expropriation by corporate insiders and also by the host government themselves. He documents that the host state can establish, enforce, and break rules that affect investors' payoff within that country, including that of foreign investors. Similarly, Kerner (2014) suggests that if policy measures are not conducive (and clear) to foreign investors they can react by boycotting the market and investing elsewhere where policy convergence is more advantageous. This again reflects the notion that the action of policymakers themselves could disadvantage their competitive appeal for attracting foreign investors who hold the flexibility and choice of diverting their funds across the globe.

that although prices in the financial markets are projections of future cash flows, they are also affected by government actions (Bond and Goldstein, 2015). This implies that the information foreign investors extract from recent prices concerning future cash flows is thus endogenous and could also be influenced by government policies, particularly by exogenous policy announcements. Bond and Goldstein (2015) further stress that these effects could be severe if the information and policy goals are not transparent. Although there is anecdotal evidence of the impact of information uncertainty on foreign portfolio investors' sentiments in emerging markets, the current literature does not offer any systematic and rigorous scientific investigation. The lack of evidence is perhaps dictated by the unavailability of the reliable market–based data and an experimental setting for establishing a credible causal link between information uncertainty and the trading of foreign portfolio investors. We use unique transaction–level data and a quasi–experimental setting whereby exogenous information uncertainty related to tax provisions is exploited to establish the causal link with FII transactions.

Our setting of a sudden unexpected exogenous policy announcement is the General Anti Avoidance Reform (GAAR) declared in March 2012 by the Indian government that threatened to impose additional tax obligations on FII transactions.[3] The announcement was unexpected and needed to be more transparent regarding its implementation. It needed clarity on how (whether the onus would be on FII or the tax authority) and to what extent (retrospectively or prospectively) the GAAR provisions would be applied. This created uncertainty in the investment environment for FII. Although a further announcement was made, postponing the effective date by one additional year, more was needed on the ambiguities associated with the first announcement. Finally, at the end of June 2012, a draft guideline was issued that

[3] See section 2 for further elaboration on GAAR provision.

significantly clarified the scope and practicalities of the GAAR provisions.[4] This exogenous shock between March and June 2012, and the availability of unique daily transaction–level data on foreign equity portfolio trading, provide us with an ideal experimental setting to test how FII react to an ambiguous regulatory environment from PIU.

This paper has three important findings. First, FII reacts severely to the announcement of the GAAR, with positive FII flows before the announcement turning negative in the post–announcement period. This result provides strong support for our view that PIU has a significant impact on the trading behaviour of FII. The PIU generates potential deadweight costs for the FII, who react by withdrawing from the market. Concerning economic significance, our results show that the average daily withdrawal by FII during the PIU period was at least 0.713 basis points of the market capitalization (USD 0.19 million) for an average traded equity.[5] Second, the policy announcement's negative impact is immediate and observed from the day following the date of the first announcement and not from the proposed effective date. Third, the sentiments of the FII gradually turn positive when the PIU (ambiguities surrounding GAAR) are removed.

In summary, our study finds strong support for the conjecture that PIU, in addition to IA, influences the trading behaviour of FII in emerging markets. These results are robust to a quasi–natural experiment and a series of robustness tests. Additionally, although the not focus of our study, we also find significant evidence of return–chasing behaviour, where recent higher returns drive higher foreign inflows (consistent with the IA framework of Brennan and Cao, 1997 and prior empirical evidence). These results complement the existing literature by

[4] See *The Hindu* (30 June 2012): "GAAR norms only a draft, says PMO"
URL: http://www.thehindu.com/business/Economy/gaar–norms–only–a–draft–says–pmo/article3584189.ece (date accessed 18 December 2015).
[5] Applying the daily average USD/INR rate for the year 2012 of INR 54/US $ (Source: India's Central Bank, Reserve Bank of India).

offering credible evidence based on firm–level IA proxies compared to existing studies that generally use market–level aggregate flow data (Bekaert et al., 2002; Ülkü, 2015).

Our study makes three important contributions to the literature. First, we suggest that PIU is a contributory driver in the trading behaviour of FII. We, therefore, add to the growing literature that investigates the trading behaviour of FII in emerging markets where IA is the core explanatory factor (Brennan and Cao, 1997; Richards, 2005; Marshall et al., 2022). Second, Griffin et al. (2004) argue that since most PIU studies use daily, weekly, monthly or quarterly market–level aggregate flow data, the lack of statistical power is one of the potential reasons for the mixed results observed in the literature on investor trading behaviour.

Third, we contribute to the literature by using individual firm and FII transaction level data to capture the exogenous effect of PIU (Marshall et al., 2022). The granularity of the dataset affords us the statistical power to undertake very short–term regression analysis. More importantly, instead of using prices, which can be endogenous, we use a quasi–natural experiment by exploiting an unexpected exogenous shock offering the opportunity to use a quasi–natural investigation. Such a setting accords the confidence of establishing credible causality.

Finally, our study extends the literature on the causes of the limits of financial globalization. Stulz (2005) shows that a higher level of trading in financial assets by FII is associated with a greater degree of financial globalization, which helps the country to reap advantages in the form of lower cost of capital and other productivity benefits (see Stulz, 1999 for a review). However, Stulz (2005) also notes that foreign investors hold a relatively large proportion of foreign equity in developed countries compared to emerging market countries. Drawing on the neoclassical models in which the only source of friction is the explicit barriers to trading financial assets, such as taxes on foreign investors, the literature argues that the aggregate benefit of foreign investors exists only in the absence of explicit barriers (Marshall

et al. 2022). Since our study is directly related to state–controlled tax–related policy, we show how unexpected changes in explicit (formal) barriers can dramatically change the trading level of FII, thus influencing the degree of financial globalization.

The rest of the paper is as follows. The next section provides a brief review of the background and the key dates of the GAAR announcement. Section 3 describes the theoretical framework we use to motivate our empirical study. Section 4 describes the FII transaction data followed by a discussion of the empirical results in section 5. Finally, we conclude the paper in section 6.

2 General Anti Avoidance Reform (GAAR)

On March 16 2012, India's finance minister unexpectedly announced the introduction of imposing GAAR provisions on FII effective from April 1 2012. GAAR was an anti–tax evasion provision aimed at empowering the Indian tax authorities to deny capital gain tax benefits if the transaction were without commercial substance or executed only with a tax benefit motive (see Appendix A for information on the potential tax benefits enjoyed by FII in India).[6] However, as shown in Figure 1 (box 1), two significant uncertainties were associated with the announcement. First, it was unclear whether the GAAR provisions would be imposed retrospectively or prospectively. Second, whether the FII themselves needed to prove that the transaction was not executed for tax benefit only, or the burden of proof would be on the tax officials.

…**Insert Figure 1 about here**…

[6] "The government wants to plug as many holes as possible," said Jagannadham Thunuguntla, head of SMC Global. "If your fund actually belongs to the US and just to get a tax advantage, you've created an artificial company in Mauritius…Mauritius is not being used as a residence, just a tax shelter. [The government's point is that] the tax–avoidance agreement with Mauritius should not be made a mockery of." (Financial Times, 29 March 2012).

On May 7 2012, India's finance minister made a second announcement notifying FII that GAAR would be delayed by one year, i.e., the effective date would be April 1, 2013, and not April 1 2012, as initially proposed in the first announcement. However, as noted above, the second announcement did not clarify the two uncertainties related to the first announcement. The first uncertainty was whether GAAR would be invoked prospectively or retrospectively. The second was whether the onus of proof would be that of the tax authorities or FII (see box 2 of Figure 1). Finally, on June 29, 2012, the government clarified the ambiguous provisions, clearly indicating that GAAR would be imposed prospectively on transactions from April 1 2013, i.e. the proposed implementation date, and the onus of proof responsibility would be on the tax authorities (box 3 Figure 1).[7] As seen in Figure 1, the period between the first trading day (March 19 2012) following the first announcement (March 16 2012) and the third announcement (June 29 2012) offers us an ideal experimental set–up to investigate how FII reacts to the PIU created by the sudden and unexpected announcement of the GAAR provision.[8]

3 Hypothesis development

Our study follows the theoretical framework of Bacchetta and Van Wincoop (2000). This framework demonstrates the dynamics of capital flows in emerging markets when gradual liberalizations (such as reductions in taxes) are introduced. Suppose FII prefer to allocate their wealth, *W*, between the Indian market *(IND)* and other *N* countries. Thus, the total number of markets invested is *N +1*. Period *t* expected returns on investment in each (n_i) of other countries *(*$N=\sum_{i=1}^{N} n_i$*)* are given by $r_{n_i\,t} \sim N(\bar{\mu}_N, \sigma_N^2)$. Let period *t* returns on Indian equities *(IND)* be $\mu_{IND,t} \sim N(\mu_{IND}, \sigma_{IND}^2)$. For FII, the return on

[7] See *The Hindu* (30 June 2012): "GAAR norms only a draft, says PMO".
URL: http://www.thehindu.com/business/Economy/gaar–norms–only–a–draft–says–pmo/article3584189.ece (date accessed 18 December 2015).
[8] From information available on 7 January 2015, GAAR has been postponed to 2017. See http://www.livemint.com/Politics/6IP8PO6wHsvQe7FkjFaruK/GAAR–deferred–by–two–years.html (date accessed 7 January 2015).

Indian market is subject to a tax, $\tau_{IND,t}$. The incorporation of the tax means a net pay–off of:

$$r_{IND,t} = \mu_{IND,t} - \tau_{IND,t} \quad (1)$$

and the conditional expected return is $\bar{r}_{IND,t} = \bar{\mu}_{IND,t} - \tau_{IND,t}$. The information set in our case includes information asymmetry and other push and pull factors. In Equation 1, $\tau_{IND,t}$ represents the existing applicable taxes, which the investors know in advance. We assume that the returns are uncorrelated across countries and $\sigma_{IND}^2 = \sigma_N^2$ and investors have a preference for exponential utility function $U(C) = e^{-\theta C}$, with consumption *C* equivalent to portfolio return, i.e. $R_t \times W$, and θ is the degree of risk preference ($\theta > 0$). FII prefer allocations that maximize period *t* utility, which is a function of the mean-variance trade-off as presented in Equation 2:

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

where $n \in [1, N+1]$, India is the $(N+1)^{st}$ equity market, α_{nt} is the allocation weight of country n_i in the portfolios (with $\sum_{n=1}^{N+1} \alpha_{n_i\, t} = 1$), $\gamma = \theta W$, . The portfolio return R_t is given by Equation 3:

$$R_t = \sum_{n=1}^{N} \alpha_{n_i\, t}.\, r_{n_i\, t} + \alpha_{N+1,t}.\, r_{IND,t} \quad (3)$$

Defining the average expected return on other countries as $\bar{r}_t = \sum_{n=1}^{N} \bar{r}_{n_i t}/N$ and the expected return on the Indian market as $\bar{r}_{IND,t}$; the solution of the objective function leads to an allocation in the Indian market (i.e. *$(N+1)^{st}$ market)* by FII of:

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

Using $\overline{r}_{IND,t} = \bar{\mu}_{IND,t} - \tau_{IND,t}$, we get:

$$\alpha_{N+1,t} = \frac{1}{N+1} + \frac{(\bar{\mu}_{IND,t} - \tau_{IND,t}) - \left[\frac{\bar{r}_{IND,t} + N\bar{r}_t}{N+1}\right]}{\gamma\sigma^2} \quad (5)$$

Following the arguments of Bacchetta and Van Wincoop (2000), and Edison and Warnock (2008), Equation 5 suggests that an expected increase in $\tau_{IND,t}$ should affect the future payoff and thus discourage FII to reduce their portfolio weight in the Indian equity market. In our case, the unexpected and ambiguous announcement of the GAAR provision should increase the expected $\tau_{IND,t}$ to FII. If the probability-weighted expected value of the additional tax liability is $\varphi_{IND,t}$ and with the assumption of zero pre-announcement liability, the expected liability $\varphi_{IND,t}$ increases from $\varphi_{IND,t} = 0$ to $\varphi_{IND,t} = \bar{\varphi}_{IND,t}$. After the announcement, the portfolio weight in the Indian equity market (i.e. *(N+1)*st market*)* by FII is thus given by $\hat{\alpha}_{N+1,t}$ as:

$$\hat{\alpha}_{N+1,t} = \frac{1}{N+1} + \frac{(\bar{r}_{IND,t} - \bar{\varphi}_{IND,t}) - \left[\frac{(\bar{r}_{IND,t} - \bar{\varphi}_{IND,t}) + N\bar{r}_t}{N+1}\right]}{\gamma\sigma^2} \quad (6)$$

Equation 6 implies that an expected rise increases in $\varphi_{IND,t}$ from 0 to $\bar{\varphi}_{IND,t}$, after the GAAR announcement, should result in outflows from the Indian equity market. Subtracting Equation 6 from Equation 5 shows us the difference in portfolio allocation in the Indian market after the announcement of GAAR provisions:

$$\alpha_{N+1,t} - \hat{\alpha}_{N+1,t} = \bar{\varphi}_{IND,t}\left(\frac{N}{\gamma\sigma^2}\right) \quad (7)$$

Thus, the difference in allocations, as shown in Equation 7, is attributable to the increase in tax liability $\bar{\varphi}_{IND,t}$ arising from the policy announcement that created uncertainty. The literature identifies such friction as a country's political risk. Bekaert and Hordick (2018) note that for a foreign investor, such risk could be the possibility that the host state could dramatically change the "rules of the game", which among myriads of issues, also includes an unexpected increase in taxes.

Based on the model, we would expect portfolio inflows to follow its pre–announcement trend (keeping $\tau_{IND,t}$ constant) but expect outflow with the introduction of new tax liability $\bar{\varphi}_{IND,t}$ for FII. Thus, we propose to test the following hypothesis.

H_1: In the post–GAAR announcement period, we expect firms to experience significant withdrawal from FII compared to pre GAAR period.

Further, we would expect the $\bar{\varphi}_{IND,t}$ to keep increasing as the uncertainty related to the announcement increases, and thus, in a dynamic case, we would expect the outflow to continue until $\bar{\varphi}_{IND,t}$ is eliminated, which in our case, is the third announcement that eradicates the ambiguities related to the GAAR announcement.

However, findings in the literature suggest FII investments may not flow in promptly when the uncertainty is removed, particularly in the case of emerging markets, for what is referred to as the lingering effect of uncertainty. For example, Gulen and Ion (2016) document that investment flows may take, on average, two to three years to recover. Likewise, Julio and Yook (2012) and Jens (2017) also support the conjecture that investments do not completely recover in the post–uncertainty period (elections). Honig (2020) offers similar evidence, which shows that foreign capital outflows before elections but does not revert to inflows immediately after the election. Thus, in light of the literature on the lingering effect of uncertainty, we also propose to test the following hypothesis.

H_2: In the post–GAAR eradication period, FIIs' capital inflows should either remain negative or, if positive, should be significantly smaller in magnitude compared to the outflows after post GAAR announcement period.

4 Data and Preliminary Figures

The primary dataset used in this study is the transaction level data of FII and their subaccounts. The Securities Exchange Board of India (SEBI) maintains a record of individual transactions of FII and is available from National Security Depositories Limited (NSDL).[9] We restrict our analysis to the purchase and sale of listed equities in the secondary markets. These comprise 99.84% of all transactions by FII. For instruments traded, 99.94% of them were listed equities which we include in our analysis. We cannot identify the identification details of individual FII, their subaccount, and the corresponding broker of the related transaction (see footnote 10). This limits us from undertaking analysis at an individual equity level by using the equity (firm level) identifications using the International Securities Identification Number (ISIN) code. Given our purpose to test whether the PIU period (March 19 – June 29 2012) affected the trading behaviour of FII, our sample covers a period spanning January 1 – June 29 2012.

Figure 2 reports monthly net trading (purchase – sales, in INR million) of the listed Indian equities by all FII for 2012. The total net value traded by FII for the first three months registered positive inflows, with the highest being INR 217 billion for February 2012. However, after the GAAR announcement on March 16 2012, these aggregated net values for April and May 2012 were very low (negative in May 2012). Although the net trading increased in June 2012, after the postponement announcement of May 7 2012, the value of roughly INR 40 billion for June 2012 is almost half that of the figure observed for March 2012. The figures for April, May and

[9] NSDL reports the following nineteen different fields of this dataset: Custodian code, Report Date, Transaction ID, FII Registration (identify masked), Sub Account Registration Number (identity masked), Broker Registration Number (identify masked), Scrip name, ISIN code, Transaction date, Transaction type, Stock exchange code, Settlement code, Transaction rate, Transaction quantity, Value, Instrument type, Reason for delay in reporting, Reporting type, and Reason for amendment. For further details see the website of NSDL (https://www.fpi.nsdl.co.in/web/StaticReports/FIITradeWise2008/FIITradeWise2008.htm)

June 2012 are the lowest relative to any other months of the year 2012. We attribute this decrease to the PIU period from March 19 – June 29 2012.

…Insert Figure 2 about here…

5 Empirical Results

5.1 Summary Figures

Following the literature on modelling the dynamics of trading by foreign investors in emerging markets (Bekaert et al., 2002; Froot et al., 2001; Richards, 2005; Marshall et al., 2022), we aggregate per day FII trading by firm level and scale the net trading by the firm's previous day's market capitalization. We denote this variable as net trading scaled by the previous day's market capitalization (in basis points) as defined in Equation 8:

$$NTSMC_{it} = \frac{\sum_{j=1}^{n}(quantity_{i,t} \times price_{i,t})}{MCap_{i,t-1}} \tag{8}$$

where: $\sum_{j=1}^{n}(quantity_{i,t} \times price_{i,t})$ is the net purchase by foreign institutional investor (*j*) on the trading day *t* of equity *i*. The term $quantity_{i,t}$ is the number of equities *i* purchased at $price_{i,t}$ by all FII. The value of $quantity_{i,t}$ is positive if the transaction is a purchase and negative when it is a sale. The term $MCap_{i,t-1}$ is the market capitalization of firm *i* on trading day *t–1*.

We examine the summary figures of five different window periods and conduct a simple paired *t*–test for the difference in $NTSMC_{it}$ before and after the GAAR announcement on March 16 2012. For example, for the one–day window, the mean of $NTSMC_{it}$ for Pre–GAAR uses data for March 16 2012, and the Post–GAAR includes data for March 19 2012. Similarly, for the one–week window, we find the mean of $NTSMC_{it}$ from 12 – 16 March (Pre–GAAR week) and 19 – 23 March (Post–GAAR week). This suggests that for the one–week window period, the sample contains two weeks of data; the case is similar for the one– and two–month windows. For the GAAR uncertainty window, the post period spans the uncertainty period, i.e.,

from March 19 – June 29 2012. The pre– PIU period includes a sample from January 1 – March 16 2012.

Table 1 shows that the difference in the average daily $NTSMC_{it}$ in the Post–GAAR period, relative to the Pre–GAAR period, is negative and statistically significant at the 1% level. We observe a statistically significant outflow of 0.549 basis points in one trading day following the GAAR announcement. The average $NTSMC_{it}$ difference figures are very similar in magnitude for the one–week, one–month and two–month windows and the GAAR uncertainty period.[10] We continue to observe a statistically significant outflow of –0.543 basis points during the GAAR uncertainty period. With the average market capitalization being INR 127,157.4 million, the economic effect translates into a daily average of INR 6.91 million (USD 0.138 million) per equity during the GAAR uncertainty period. [11] These difference figures signal that the uncertainty created by the abstruse GAAR provisions may have had detrimental consequences on the trading sentiments of FII.

…Insert Table 1 about here…

5.2 Basic Regression Analysis

The first set of daily panel data regressions we run is based on different periods, i.e., from a one–day to a two–month window. We create a dummy ($GAAR\ effect_t$) for the second period of each window. For example, for the one–day window, the $GAAR\ effect_t$ dummy takes the value of one if the period is trading day 2 (i.e., March 19 2012) post the announcement period of March 16 2012 (17 and 18 are the weekend). The sample thus includes only two trading days of data, i.e., 16 and 19 March 2012. We generate similar dummies for other window periods. Following the existing literature, we control for several factors ($\boldsymbol{X}$ – defined in

[10] Instead of using firm level data the results of paired *t*–test are similar when we use daily aggregated time series data.

[11] The average USD/INR rate was 54/USD for the year 2012 (Source: India's Central Bank, Reserve Bank of India).

Appendix B) to rule out any other rival explanations that the shock-based exogenous $GAAR\ effect_t$ variable may be competing (Marshall et al., 2022). We lag all the controls used by one day (where unavailable, we take the most recent information). The first control we incorporate is at the firm level.[12] As noted earlier, tests of IA suggest that recent returns highly influence foreign investors in emerging markets. We capture this by taking the previous day's average return of the firms in the FII trade on a particular day. This factor, sourced from the Prowess database, captures the momentum effect (the IA hypothesis) and any other firm characteristics or news that might motivate FII to trade. We denote this as *Firm return* when reporting the results.

The second set of controls we use is time–varying national factors that could persuade investors to trade. The literature notes these as pull factors. For the market–level momentum hypothesis, we use the one–day lagged return on India's biggest and most liquid stock exchange – the National Stock Index of India (*NSE return*). We obtain the NSE 500 index from the NSE website. The local equity market volatility is captured by the daily standard deviation estimated using the past 90 days' return on the NSE 500 index. For the exchange rate movement effect, we include the USD/INR daily exchange rate volatility (standard deviation) constructed using the previous 90 days' exchange rate figures obtained from the Reserve Bank of India. The time–varying national macroeconomic prospect is factored in by the recently available last quarter's real gross domestic product (GDP) growth sourced from OECD.

Finally, we also apply global information variables, referred to as push factors. We use the previous day's return on the world market (*World returns*) using the MSCI All–Country Total Return Index. We also use the previous day's return on the emerging market (*EM return*) using the daily MSCI Emerging Markets' total return index. The MSCI return indexes are obtained from Thomson Reuters. Global risk aversion is incorporated by using the lagged

[12] Firm size is already considered in the construction of the dependent variable noted in Equation 1.

return of the VIX index of the Chicago Board Options Exchange (*Global VIX return*) as a measure of the market's expectation of near–term global volatility (Porras and Ülkü, 2015).

Further, we also include the *flight to safety* effect by using the previous day's return on one–year US Treasury bill (*One year US TB return*) rates acquired from US Treasury International. This captures any changes in the global interest rates that could persuade FII to transact in risky emerging markets. Table 2 presents the summary statistics of the control variables during our sample period.

…Insert Table 2 about here…

The daily data available for each firm allow us the statistical luxury of running a daily fixed effect panel data model, as shown in Equation 9, thus controlling for firm fixed effects ($\boldsymbol{\gamma_i}$) as well as time (days) fixed effects ($\boldsymbol{\delta}_t$). Further, standard errors clustered at the firm level and time level (where denoted):

$$NTSMC_{it} = \beta(GAAR\_Effect_t) + \boldsymbol{X}.\delta + \boldsymbol{\gamma_i} + \boldsymbol{\delta}_t + e_{it} \qquad (9)$$

Based on our theoretical framework, if the drop in FII trading on day one post the GAAR announcement is attributed to PIU, we would expect β to carry a negative sign and be statistically significant. The results of the various versions of Equation 9 are presented in Table 3. Models I–IV show that the GAAR announcement significantly changes the trading behaviour of FII, with the quantitative effect being, on average, a minimum of 0.419 basis points (p<0.01) of the market capitalization per day for an average equity during the uncertainty period. From an endogeneity point of view, it is worth noting that the estimate (β = –0.519, p<0.01) related to the shortest possible period, i.e., one–day window, affords us high confidence in avoiding the influence of other factors. This is particularly so in our setting, where the daily average per equity trading figures were positive (see Figure 2) for the last three months. However, unexpectedly, the announcement on March 16 plunged the corresponding trading on March 19 into negative terrain. The one–day window result also suggests that the

effect of PIU takes place right from the following day (i.e., March 19 2012) of the announcement instead of the effective day of April 1 2012.

…Insert Table 3 about here…

Although the short windows indicate the GAAR effect, we are particularly interested in examining the impact of the *Post–GAAR Period* window, i.e., the period between March 19, 2012, and June 29, 2012. In the sample covering the first six months of 2012, we produce a dummy taking the value of one for the *Post–GAAR Period* in Model V and VI. This is the PIU period (see Figure 1) when FII faced increased deadweight costs of investing in the Indian market. However, given the length of the *Post–GAAR Period* window, we now need to be confident that our results are not driven by other alternative explanations that could be correlated with our *GAAR effect* dummy. In Model V, we include the *GAAR effect* dummy without control variables; in Model VI, we incorporate control variables. Since we run a fixed effect panel data model, we also control for firm–specific effects (γ_j) and time (days) fixed (δ_t) and correct the standard error by double clustering at the FII and time (day) levels (Peterson, 2009).

Model V and VI shows that our key variable of interest (*GAAR effect)* enters the regressions with expected signs and are also statistically significant at the 1% significance level. After controlling for all the determinants, we find a negative equity flow of –0.473 (p<0.01) basis points following the GAAR announcement. Economically, it translates into a daily withdrawal of INR 6.02 million (around USD 0.12 million) for each equity. The results support our central hypothesis that the sudden pull–out by FII is attributed to the ambiguous GAAR provisions announced by the Indian government, which created an environment of uncertainty. Among the controls, the consistent statistical significance of *Firm return* supports the IA arguments. However, we also find evidence of the significant influence of global push

factors, particularly US TB rates (consistent with recent studies, see Ülkü, 2015; Sarno et al., 2016).

5.3 Firm-level Difference in Differences Analysis

In all our fixed effect regressions, we have used various period dummies reflecting the GAAR effect. In this framework, we control for the time-varying firm level, emerging and global market level factors, and the unobserved firm–level and time–fixed effects. Despite this, our estimate could still be driven by other systematic shocks that could have occurred during the same period, particularly in the absence of comparable treated and control groups. We address this using the equity (firm) level difference in differences (DiD) quasi–experimental method. Vig (2013) notes that DiD compares the effect of a shock on groups that are affected or more affected (henceforth, treated) with those that are unaffected or least affected (subsequently, control). As such, when we take the difference in the differences between the treated and control groups' average $NTSMC_{it}$, before and after the GAAR announcement, we eliminate the bias that stems from changes other than the GAAR effect that could potentially drive FII trading decisions.

The challenge in our case is the identification of treated and control groups. As noted earlier, one of the uncertainties associated with the GAAR announcement was that it was not clear if the new provisions would be invoked on retrospective or prospective transactions. Therefore, it is conceivable that firms on which FII had relatively higher exposure of cumulated net trading in the pre-announcement period would be more affected than those with lower exposure. The Prowess dataset we use reports information on the 2–digit National Industrial Classification of India (NIC). As shown in Appendix C, we use the NIC2 code and take the sum of the FII net trading figures of all firms in the different sectors for January – April 2012. We sum up the figures of January and February to identify the past two months' cumulated net

trading exposure before the GAAR announcement and sort the entire table against this total figure reported in column 4.

As seen in column 4 of Appendix C, cumulated net trading exposure in certain sectors, such as financial, IT, manufacturing etc., is significantly higher than in coal mining and communications. We use the median net trading figure of approximately INR 189 million to create the treated and control groups. The sectors having cumulated net trading exposure equal to or above INR 189 million are in the treated group, and those below are in the control group.[13] We argue that any adverse shock in FII's sentiment should negatively affect the treated group firms more than the control group firms.

To examine the parallel trend assumption, we examine the weekly cumulate net traded value (weekly purchase value – weekly sales value) for the treated and control groups for the pre–GAAR (week 1 to week 11) and post–GAAR periods (week 11 – week 25). As seen in Figure 3, both the treated and control group exhibits a similar upward trend in the net equity trading value before the GAAR announcement week (denoted by the horizontal line). However, in the post–GAAR announcement, while the control group firms showed no significant changes in their trend, the treated group firms experienced a downward trend in the equity flow. The cumulated net trading value is INR 370 billion for the treated group during the pre–GAAR period compared to INR –8.4 billion (sales greater than purchases) for the control group. However, in the post–GAAR period, the drop in the treated group is significantly higher (54 – 370 = INR –316 billion) compared to a slight increase in the control group [–6.8 – (–8.4) = INR 1.6 billion].

…Insert Figure 3 about here...

[13] Given the wide variations in the dataset we use the median value. However, the use of mean value produces qualitatively and quantitatively similar results.

We now perform the DiD examination in two ways. First, we evaluate the mean difference in $NTSMC_{it}$ for the treated and control groups before and after the GAAR announcement. As reported in Panel A of Table 4, the average $NTSMC_{it}$ for the treated group during the pre–GAAR period was 0.402 basis points, whereas the same for the post–GAAR period was –0.164 basis points, with the difference being –0.566. This difference, statistically significant even at the 1% significance level, implies a substantially material downward shift in the trading trend by FII. The same difference for the control is 0.147 basis points. However, this difference is also not statistically significant. This further suggests a comparatively much smaller GAAR effect on the control group. The mean DiD is, therefore, –0.713 basis points per day of market capitalization for a typically listed firm on the Indian stock market during the PIU period. Economically, this translates into a daily withdrawal of INR 9 million for each equity (around USD 0.17 million).

…Insert Table 4 about here...

The second approach we take to use the DiD method is by running regressions with different specifications of Equation 10 below:

$$NTSMC_{it} = \beta(GAAR\ effect \times TRMT\_GRP) + \boldsymbol{X}.\delta + \boldsymbol{\gamma_i} + \boldsymbol{\delta}_t + \boldsymbol{\alpha}_k + e_{it} \qquad (10)$$

where $GAAR\ effect$ is the dummy variable that takes the value of one for *Post–GAAR Period* from March 19, 2012, to June 29, 2012, and zero for the *Pre-GAAR Period* from January 1, 2012, to March 16, 2012. $TRMT\_GRP$ is the dummy which takes the value of one if the firm falls within the treated group (as shown in Appendix C) based on two-digit NIC sector classification. The estimated effect (β) reflects the extent to which the *Post–GAAR Period* deviates the treated firms' $NTSMC_{it}$, relative to control firms and the *Pre-GAAR Period*, following the announcement made on March 16, 2012. Based on our theoretical framework, we expect β to be negative and statistically significant. $\boldsymbol{X}$ denotes the set of control variables,

as mentioned earlier, $\boldsymbol{\gamma_i}$ is firm fixed effects and $\boldsymbol{\delta_t}$ controls for time–fixed effects (days). Standard errors are double clustered at firm and time (days) levels.

Panel B of Table 4 shows that the $GAAR\ effect \times TRMT\_GRP$ variable enters all regressions with an expected negative sign and is statistically significant at the 1% significance level. The coefficient of –0.617 (Model IV) implies that after ruling out all possible alternative explanations, the PIU caused by the GAAR announcement has a more significant adverse effect on the trading value of the treated firm compared to the control firms in the post–GAAR period. Note the DiD effect of Table 4 is similar in size to that reported in Table 3; the lowest value is –0.532 (Model II), which is not materially different from the DiD effect of Table 4. The sign, statistical significance, and economically significant DiD impact support our argument that PIU generates potential deadweight costs for the FII who react by withdrawing from the market.

Among the controls, the effect of IA is, as expected, significant, as indicated by the firm–level past returns in the Indian stock market. There is also some indication of the effects of global shocks, as noted via the statistical significance of US TB return coefficients.

5.4 Propensity Score Matched Difference–in–Difference Analysis

In this section, we eliminate the concern that the impact of policy uncertainty on FII net equity trading may be due to the differential firm characteristics by performing a propensity score matching (PSM) to identify a matched set of treatment and control firms.[14] To do so, we first estimate the probit model in which the dependent variable is equal to one if the firms belong to the treatment group and zero otherwise. We use various firm–level characteristics, such as Tobin's Q, Total assets, ROA, Leverage and Current liability ratio, as the comparable factors (Col and Sen, 2019) at the end of the fiscal year 2012 (i.e., March 2012). These

[14] Our identification strategies classify 620 firms as treatment firms and 190 firms as control firms in our final sample.

covariates are included to help satisfy the parallel trend assumptions as there should not be any firm–specific differences in characteristics between the treatment and the control group before the policy uncertainty. The model I of Table 5 (Panel A) presents the probit model estimates with standard error clustered at the industry level. The specification shows that some independent variables are statistically significant, suggesting significant variation in firms' characteristics between the treatment and the control group. We then use the propensity scores from Model I to perform nearest–neighbor PSM within a 0.01 caliper and end up with 144 unique pairs of matched firms.

We conduct a few diagnostic tests to verify the matching process. First, as shown in Model II in Panel A, we rerun the probit model for only the propensity score–matched firms. We do not find any statistically significant covariates, suggesting no observable firm characteristics difference between the treatment and the control group. Second, we examine the difference in the propensity scores in Panel B, which shows a minimal difference (within 0.01 caliper) in the scores. Finally, Panel C reports the univariate summary of covariates between the treatment and the control group and their corresponding *t*–statistics, which do not reveal any significant mean difference in the firms' characteristics.

…Insert Table 5 about here…

In Panel D, we rerun Equation 10 (similar to Panel B of Table 4) for our matched treated and control firms. We still find a significant impact of GAAR–related policy uncertainty on FII's net equity trading for treated firms compared to the control firms. Even with a reduced sample size, we find a statistically significant and economically large impact ($\beta = -0.909$, $p<0.01$), consistent with our main results.

6 Robustness Tests

6.1 Addressing Systematic Shocks

Our results could capture other systematic shocks that could have occurred during the PIU period. If such shocks are not controlled in Model IV of Table 4, the GAAR uncertainty period factor could be confounded. We searched all the major national and international financial press to identify any significant systematic shocks that could alter the trading behaviour of FII during the GAAR uncertainty period. Between March 19 and June 29 2012, we could not identify any other major unexpected shock that could drive our results. However, to rule out any such effect, we augment our regression by including the $(\boldsymbol{\alpha}_k \times \boldsymbol{\delta}_t)$ term in Equation 10. This interaction term captures any systematic shock that could correlate with the GAAR effect (Vig, 2013). The model I in Table 6 shows that this does not change the main results reported in Table 4 and is robust to the effect of any other systematic shocks.

…Insert Table 6 about here...

6.2 Alternative Treated and Control Groups

Our segregation of treated and control groups based on median traded exposure can create noise for the firms very close to the cut–off point. To reduce the impact of this possibility, we take the top 33rd percentile figure (ranked from the highest total net trading exposure, as in Appendix C) as the treated group and the bottom 33rd percentile as the control group. We also take the mean value as the cut–off value to identify the treated and control groups. Using this reduced sample, we run a fully specified specification of Equation 10. Our results in Model II of Table 6 using the 33rd percentile and in Model III using mean value are virtually unchanged concerning the sign, the statistical and economic significance of the estimations to the results in Table 4.

6.3 Alternative Uncertainty Period

We argue that PIU, to some extent, was removed when the Indian government made the second announcement on May 7, 2012, to postpone GAAR by an additional year. This could have provided strong signals to the FII community regarding the intention of the Indian government to reduce the PIU caused by the initial GAAR announcement. The month of June 2012 saw net trading revert to positive figures compared to the net outflows in the preceding two months. If this is the case, our GAAR Uncertainty Period (March 19 – June 29 2012) used in the previous regressions could incorporate the reduced uncertainty period of May 8 – June 29 and thus may not fully reflect a PIU period.

To address this issue, we regenerate the uncertainty dummy from March 19 – May 7 and use this in the fully specified regression of Equation 10. As seen from the results in Model IV of Table 6, the DiD effect bears a negative sign and is statistically significant at the 1% level. The economic impact seems to have increased (and is consistent) compared to that reported in Table 4. This is not unexpected, as the new GAAR dummy now only incorporates the period with negative outflows (see Figure 2).

6.4 Dealing with Attrition Bias

Despite using an unbalanced panel dataset in the previous estimations, if the non–trading of individual firms on some dates relative to others is systematic, our estimates could suffer from sample selection/attrition bias. We, therefore, run the same fully specified regression of Equation 10 for the same sample period of January 1 – June 29 2012, but only using a balanced panel dataset for that period. The results reported in Model V of Table 6 indicate that even after taking care of any possibility of attrition bias, our support of the PIU impacting the trading of FII still holds.[15]

[15] Please note that the size of the estimates changes as the regression is based on a much smaller sample size of 10,540 observations compared to roughly 47,000 observations in Table 4. In fact, the quantitative effect seems to become even more prominent.

6.5 Addressing the Possibility of a Cyclical Effect

Finally, although there is no economic justification, it could be that our results are simply capturing cyclical effects that could be prevalent in the Indian stock market from March 19 – June 29, 2012, every year. If this is the case, we may be exposed to the possibility of a false experiment by capturing the regular cyclical effect. To rule out this possibility, we run placebo effect regressions capturing the same period of March 16 – June 29 for the same treated and control groups but for the years 2010 (two years before the PIU) and 2014 (two years after the PIU). For this, we create two dummies taking the value of one if the period covered is March 19 – June 29 for both year 2010 and year 2014 (i.e., placebo years). We interact these dummies with our treated group, denoting them as a *Cyclical effect* in our regressions.[16] If our regression captures any cyclical impact, the estimates would be similar in size, sign and statistical significance to those reported for 2012. Table 7 shows that the estimate for 2010, although statistically insignificant, carries the opposite sign of the GAAR effect. The estimate for the year 2014 is also positive and statistically insignificant, conferring confidence that cyclical effects do not drive our results.

…Insert Table 7 about here...

6.6 Other Alternative Explanations

Given the systematic change in the trading behaviour during the uncertainty period could arguably be associated with PIU, we need to add caveats and rationales to rule out other possible explanations. First, our results, consistent with Ülkü (2015) and Sarno et al. (2016), generally find that recent equity returns and global push factors (particularly US TB return) also play a significant role in driving portfolio flows. However, most of the existing studies examine the effect of different lag structures of local and global factors. When we include

[16] Note these are exactly the same regressions as specified in Equation 11 (fully specified), including the same sample period but for the years 2011 and 2013 separately.

lagged values of up to five periods of the controls, the results related to the DiD effect remain statistically and economically similar. For brevity, we do not report the results, but these are available from the authors on request.

Another possible argument is whether the change we observe in FII trading is due to the first announcement itself or attributed to the uncertainty it created. There are two possible reasons why this may not be the case. First, the announcement *per se* does not change any existing tax rate in absolute economic terms; instead, it offers tax authorities greater rights to securitize tax avoidance transactions of FII. Second, even if we assume that, in an equilibrium framework, investors undertake a reallocation with the new information, it should happen within a short period of time and not as we find until the uncertainty is removed. Another potential driver could be the effect of the overall market price index where GAAR does not affect the fundamental value of the stocks but alters payoffs to only one investor group, i.e., FII. From the point of view of an accurately calibrated theoretical equilibrium model, the new equilibrium price could be an essential factor in the trading of FII, mainly because FII could buy the index when it is below its fundamental value. However, we have controlled for this using both the stock level return index and market level return index. Thus, any price pressure factors are considered in the empirical set–up.

Finally, other firm characteristics such as corporate governance, gearing, return on equity, and book–to–market value could also drive the results. However, the data available on these firm–level characteristics for our period are those of March 31, 2012, for each firm. Since we only have one observation for each firm for the entire sample period, we cannot use these data in our fixed effect model. Hence, any firm–specific effect is accounted for in the estimations. Moreover, the firm–level previous day's return significantly captures any time–varying firm–specific effects.

6.7 Post–GAAR eradication period

The theoretical framework discussed in section 3 suggests that FII equity trading should reduce during the post–GAAR period. However, it is important also to consider the FII's trading reaction following the announcement on June 29 that removed the uncertainties surrounding GAAR. First, we conduct a simple paired *t*–test for the mean differences in $NTSMC_{it}$ before and after the announcement on June 29, 2012, using five different window periods (similar to Table 1). The results are presented in Panel A of Table 8. We use the trading period from July 2012 to September 2012 for the post–GAAR uncertainty period. We find a significant rise in $NTSMC_{it}$ in the post–GAAR eradication period compared to the post–GAAR period. It is also important to note that though there is a rise in $NTSMC_{it}$, the level of $NTSMC_{it}$ is very low compared to $NTSMC_{it}$ in the pre–GAAR period. For instance, the average $NTSMC_{it}$ in the pre–GAAR period is 0.343 basis points, whereas it is around 0.072 basis points in the post–GAAR eradication period. These results suggest that while uncertainties result in immediate outflow of foreign equity trading, removing uncertainties does not necessarily result in immediate inflow. These findings are consistent with the findings of Marshall et al. (2022).

…Insert Table 8 about here…

In Panel B, we investigate the FII equity trading using the following regression equations:

$$NTSMC_{it} = \beta_1(GAAR\ Eradication) + \boldsymbol{X}.\delta + \boldsymbol{\gamma_i} + e_{it} \quad (11)$$

$$NTSMC_{it} = \beta_1(GAAR\ Eradication \times TRMT\_GRP) + \beta_2(GAAR\ Eradication) + \boldsymbol{X}.\delta + \boldsymbol{\gamma_i} + \boldsymbol{\delta}_t + e_{it} \quad (12)$$

where, all the variables are as previously defined. $GAAR\ Eradication$ is a dummy variable which takes the value of zero for the post–GAAR period (March 19 – June 29 2012) and one for the post–GAAR eradication period (July 2 – September 28 2012). The results in Models I – V reveal findings consistent with Panel A. However, once we introduce the push and pull factors in Model VI, we do not find any significant increase in $NTSMC_{it}$ in the post–GAAR

eradication period compared to the post–GAAR period. We also do not find any significant change in our difference–in–difference setting, which reveals that the shift in $NTSMC_{it}$ in the post–GAAR eradication period for the treatment group firms is not significantly different from the change in $NTSMC_{it}$ for the control group firms. These results suggest that removing PIUs does not necessarily result in an immediate inflow of foreign equity trading. These subdued flows are consistent with the lingering effect of uncertainty literature, as noted in section 3 (Julio and Yook, 2012; Gulen and Ion, 2016; Jens, 2017; Honig, 2020).

7 Concluding Remarks

The literature notes that FII in emerging markets are momentum investors driven by recent returns. The current literature attributes such feedback trading behaviour to the theoretical notion of IA between local and foreign investors. However, our study suggests that FII's trading behaviour in emerging markets is not only driven by IA but also by the degree of PIU. Our study uses an unexpected announcement of imposing GAAR on the trading of FII to control tax–avoiding transactions as an example of PIU. The uncertainty in the GAAR provisions was that it was unclear whether it would be imposed retrospectively and what level of authority would be delegated to the tax officials to question transactions made by FII. However, the Indian government made another announcement on May 7, 2012, postponing the effective date of GAAR by one year and finally announced it on June 29, 2012, to remove the uncertainties. Using the period of March 19 to June 29, 2012, as the PIU period and transaction level data from the Indian stock market, we undertake a quasi-natural experiment to investigate the reaction of FII to the GAAR announcements.

Our results, robust to various alternative tests, provide three crucial findings. First, we find that FII negatively reacted to the PIU caused by the announcement of the GAAR provisions. The three months pre–GAAR announcement witnesses positive net investments

from FII. However, in the post–GAAR announcement period, the net trading becomes negative. The average daily withdrawal during the uncertainty period is at least 0.713 basis points of the market capitalization for the traded equities. Second, the reaction is immediate as the boycott is observed from the next trading day following the announcement. Third, the withdrawal of funds by FII continues until the PIU is removed. Finally, the removal of PIU does not result in an immediate inflow of foreign equity trading. Our study thus concludes that PIU is an important determinant of the trading behaviour of FII. The results of our study suggest that policymakers in emerging markets, competing for global mobile capital, need to ensure clarity and stability in investment-related policies.

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Table 1: Average Daily Net Equity Trading

The table shows the paired *t–test* of the differences in average daily net trading value scaled by the previous day's market capitalization (in basis points) of listed stocks on the Indian stock market by all FII. Except for the *GAAR Uncertainty Period*, all other window periods denote the different periods of paired t–tests. *Pre–GAAR* shows the average value for the corresponding window before the GAAR announcement date (March 16 2012) and the *Post–GAAR* period after the announcement date. For example, for the one–day window, the *Pre–GAAR* period is March 16 and the *Post–GAAR* period is March 19 2012. The pre–window of the *GAAR Uncertainty Period* ranges from January 1 – March 16 2012, and the post–period ranges from March 19 – June 29 2012. The *difference* shows the Difference between *Post–GAAR* and *Pre–GAAR* average values. *t–stat* is the t–statistics of the *Difference* figure with the probability of the alternative hypothesis that the average difference is less than zero (i.e. Post–GAAR average – Pre–GAAR average <0) denoted by *p–value*. *Number of observations* is the sample size included in each window.

Window periods	Pre–GAAR I	Post–GAAR II	Difference III = II – I	*t*–stat	*p*–value	Observations
1–Day	0.539	–0.010	–0.549	–2.791***	0.001	773
1–Week	0.813	0.248	–0.565	–4.086***	0.000	3,877
1–Month	0.354	–0.044	–0.398	–5.323***	0.000	13,843
2–Months	0.354	–0.136	–0.489	–7.994***	0.000	22,958
GAAR Uncertainty Period	0.343	–0.200	–0.543	–12.362***	0.000	42,470

Table 2: Summary statistics of controls

This table shows the summary statistics of the control variables used in this study during our sample period from January 1 2012 – June 29 2012.

	Mean	Median	Std. Dev	Min	Max
Firm return (%)	0.266	0.180	2.013	–3.294	4.316
Market return (%)	0.103	0.150	0.947	–1.562	1.744
Market return volatility (%)	1.191	1.214	0.097	0.907	1.301
USD volatility (%)	0.625	0.614	0.066	0.532	0.726
Real GDP growth rate (%)	3.579	3.193	0.391	3.193	3.974
EM return (%)	0.015	0.027	0.870	–1.430	1.433
World return (%)	0.041	0.115	0.732	–1.329	1.384
US TB return (%)	0.172	0.180	0.028	0.120	0.210
Global VIX return (%)	–0.101	0.000	5.495	–10.326	10.414

Table 3: Different Periods–Based Regressions

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

$$NTSMC_{it} = \beta(GAAR\ effect_t) + \boldsymbol{X}.\delta + \boldsymbol{\gamma_i} + \boldsymbol{\delta_t} + e_{it}$$

where $NTSMC_{it}$ is the day *t* net trading value by all FII scaled by the previous day's market capitalization (in basis points) of listed stocks (*i*) on the Indian stock market. Firms traded are indexed as *i*, and daily periods are indexed as *t*. $GAAR\ effect_t$ is the dummy variable which takes the value of one in the post–GAAR period for one–day, one–week, one–month and two–month window periods. For example, for the one–day window, the *GAAR effect* dummy takes the value of one if the period is day 2 (i.e., March 19 2012) post–announcement period of March 16 2012 (17 and 18 are the weekend). The sample thus includes only two subsequent trading days of data, i.e., for 16 and 19 March 2012 for all FII. Similar dummies are generated for other window periods discussed in Table 1. $\boldsymbol{X}$ reflects the set of control variables. All the variables are defined in Appendix B. γ_i and $\delta_t$is the vector of firm and time (day) dummies and controlling for firm and time fixed effects, respectively (where applicable). e_{it} is the error term. Standard errors are corrected for clustering at the firm (double clustered at the firm and time for model VI). γ_i and $\delta_t$is the vector of firm and time (day) dummies, controlling for firm and time–fixed effects. e_{jt} is the error term. Standard errors are corrected for double clustering at the firm and time levels. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	One–day window	One–week window	One–month window	Two–month window	GAAR Uncertainty Period	GAAR Uncertainty Period
	I	II	III	IV	V	VI
$GAAR\ effect_t$	–0.517***	–0.581***	–0.419***	–0.595***	–0.533***	–0.473***
	(–2.78)	(–3.69)	(–3.79)	(–6.37)	(–6.39)	(–3.71)
Firm return						0.235***
						(13.41)
NSE return						–0.073
						(–1.19)
NSE volatility						–0.468
						(–0.48)
USD volatility						0.393
						(0.13)
Real GDP growth rate						–0.356
						(–0.65)
EM return						–0.104
						(–1.03)
World return						0.176
						(1.37)
One Year US TB return						7.350**
						(2.20)
Global VIX return						0.009
						(0.74)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect (days)	No	No	No	No	No	Yes
Number of firms	319	505	645	749	812	812
Observations	638	3,798	13,771	29,047	47,461	47,461
Adjusted R^2 (within)	0.010	0.006	0.003	0.005	0.006	0.018

Table 4: Difference in Differences Analysis

Panel A shows the difference in differences of treated and control groups for the average value of $NTSMC_{it}$ between the Pre–GAAR period (January 1 2012 – March 16 2012) and the Post–GAAR period (March 19 2012 – June 29 2012). $NTSMC_{it}$ is the day *t* net trading value by all FII scaled by the previous day's market capitalization (in basis points) of listed stocks (*i*) on the Indian stock market. *Treatment group* include firms having greater than the median value of the net trading sector exposure combined in January and February 2012 and the *Control group* otherwise (see Appendix C). Panel B reports the results of four different specifications of the following specification:

$$NTSMC_{it} = \beta(GAAR\ effect \times TRMT\_GRP) + \boldsymbol{X}.\delta + \boldsymbol{\gamma_i} + \boldsymbol{\delta_t} + e_{it}$$

$GAAR\ effect$ is the dummy variable which takes the value of one for the GAAR Uncertainty Period (March 19 2012 – June 29 2012). $TRMT\_GRP$ is the dummy for the firms in the *Treated group.* $\boldsymbol{X}$ reflects the set of control variables. All the variables are defined in Appendix I. γ_i and $\delta_t$is the vector of firm and time (day) dummies and controlling for firm and time–fixed effects, respectively. e_{it} is the error term. Standard errors are corrected for double clustering at the firm and time levels. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively. The sample period ranges from January 1 – June 29 2012.

Panel A: Mean difference in differences

	$NTSMC_{it}$				
	Pre– GAAR	Post–GAAR	Difference	t–statistics	p–value
Treated group	0.402	–0.164	–0.566***	–12.60	0.000
Control group	–0.463	–0.316	0.147	1.34	0.179
	The difference in differences =		0.713***	–7.32	0.000

Panel B: Difference–in–differences regression

	I	II	III	IV
$GAAR\ effect \times TRMT\_GRP$	–0.659***	–0.532***	–0.548***	–0.617***
	(–5.34)	(–4.03)	(–2.84)	(–3.29)
Firm return		0.215***	0.234***	0.234***
		(11.44)	(13.32)	(13.37)
NSE return			0.091*	–0.073
			(2.00)	(–1.18)
NSE volatility			–1.438	–0.473
			(–1.36)	(–0.50)
USD volatility			–2.371	0.337
			(–0.86)	(0.10)
Real GDP growth rate			–0.706	–0.353
			(–1.55)	(–0.71)
EM return				–0.105
				(–1.04)
World return				0.176
				(1.38)
US TB return				7.374**
				(2.30)
Global VIX return				0.009
				(0.75)
Firms fixed effect	Yes	Yes	Yes	Yes
Time-fixed effect (days)	Yes	Yes	Yes	Yes
Number of firms	832	832	832	832
Number of observations	47,439	47,439	47,439	47,439
Adjusted R^2 (within)	0.0045	0.0152	0.0164	0.0175

Table 5: Propensity Score Matched Difference–in–Difference

The table reports the results of Propensity Score Matching. *Treatment group* include firms having greater than the median value of the net trading sector exposure combined in January and February 2012 and the *Control group* otherwise (see Appendix C). We use PSM with the nearest neighbourhood of 0.01 caliper using various firm–level characteristics to identify matched control groups. Panel A presents the parameter estimates from the probit model used to estimate the propensity scores for the treatment and control groups. The dependent variable is one if in the treatment group and 0 if in the control group. We include firm size, Tobin's Q, ROA, Leverage, and current liability ratio as covariates (defined in Appendix B). We include industry-fixed effects, and standard errors are corrected for clustering at the industry level. Panel B reports the distribution of estimated propensity scores post–matching. Panel C reports the univariate comparison between the treatment and control firm's characteristics and their corresponding *t*–statistics. Panel D reports PSM–difference–in–difference regression results similar to Panel B of Table 2. *, **, and *** denote statistical significance at the 10%, 5% and 1% significance levels, respectively. The sample period ranges from January 1 – June 29 2012.

Panel A: Pre–match propensity score regression and post–match diagnostic analysis

	Dummy=1 if the treatment group; 0 if in the control group	
	Pre–match I	Post–match II
Ln (Total assets)	0.1645**	–0.083
	(2.59)	(–0.83)
Tobin's Q	–0.057**	–0.078
	(–2.20)	(–1.25)
ROA	1.616	0.306
	(1.04)	(0.15)
Leverage	0.005	–0.030
	(0.21)	(–0.96)
Current liability ratio	–0.003	0.013
	(–0.43)	(1.17)
Industry fixed effect	Yes	Yes
Pseudo R^2	0.050	0.016
Number of observations	676	288

Panel B: Estimated propensity score distributions

	Firms	Average	Minimum	5pct	Median	75pct	Max
Control	144	0.757	0.508	0.718	0.760	0.799	0.926
Treatment	144	0.748	0.506	0.709	0.750	0.790	0.917
Difference		0.009	0.002	0.010	0.009	0.010	0.010

Panel C: Difference in firm's characteristics

	Treatment	Control	Difference	*t*–stat
Firm Size	9.301	9.575	–0.274	–1.61
Tobin's Q	1.644	1.917	–0.274	–1.48
ROA	0.060	0.059	0.001	0.20
Leverage	0.901	1.097	–0.196	–0.89
Current liability ratio	2.145	1.679	0.466	0.84

Panel D: PSM–Difference–in–difference analysis

	I	II	III	IV
$GAAR\ effect \times TRMT\_GRP$	–0.812***	–0.695***	–0.834***	–0.909***
	(–3.68)	(–3.18)	(–3.03)	(–3.34)
Firm return		0.205***	0.239***	0.238***
		(8.45)	(10.17)	(10.21)
NSE return			0.152**	–0.075
			(2.63)	(–1.16)
NSE volatility			–0.953	0.583
			(–0.96)	(0.59)
USD volatility			–6.589**	–1.830
			(–2.35)	(–0.57)
Real GDP growth rate			–1.180**	–0.647
			(–2.63)	(–1.40)
EM return				–0.170*
				(–1.80)
World return				0.094
				(0.76)
US TB return				11.75***
				(3.15)
Global VIX return				0.006
				(0.44)
Firm fixed effect	Yes	Yes	Yes	Yes
Time fixed effect (days)	Yes	Yes	Yes	Yes
Number of firms	288	288	288	288
Number of observations	14,812	14,812	14,812	14,812
Adjusted R2(Within)	0.0035	0.0129	0.0161	0.0184

Table 6: Robustness tests

This table reports the results of five different specifications of the following equation:

$$NTSMC_{it} = \beta(GAAR\ effect \times TRMT\_GRP) + \boldsymbol{X}.\delta + \boldsymbol{\gamma_i} + \boldsymbol{\delta}_t + \boldsymbol{\alpha}_k \times \boldsymbol{\delta}_t + e_{it}$$

All the variables are as previously defined in Table 3, and Appendix B notes. In Model I, we include $\boldsymbol{\alpha}_k \times \boldsymbol{\delta}_t$ i.e. sector × time fixed effects to control for other systematic shocks during our sample. In Model II, we use the top (bottom) 33rd percentile value of the net trading sector exposure combined in January and February 2012. In Model III, we use the mean value of the net trading sector exposure combined in January and February 2012. In Model IV, we use the end of May 7, 2012, as the end of the uncertainty period. In Model V, we use a balanced panel. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

	Alternative treatment group				
	Other systematic shocks	33rd pct	Mean value	Alternative uncertainty period	Balanced panel
	I	II	III	IV	V
$GAAR\ effect \times TRMT\_GRP$	–0.595***	–0.677***	–0.605***	–0.638***	–0.871**
	(–3.06)	(–3.33)	(–3.86)	(–3.45)	(–2.14)
Firm return	0.235***	0.232***	0.233***	0.261***	0.390***
	(13.95)	(11.77)	(13.37)	(11.71)	(9.65)
NSE return	0.072	0.075	0.073	0.000	0.160
	(1.14)	(1.14)	(1.18)	(0.01)	(1.27)
NSE volatility	–0.473	–0.350	–0.436	–0.704	–0.915
	(–0.49)	(–0.37)	(–0.46)	(–0.26)	(–0.54)
USD volatility	0.462	0.705	0.683	–2.074	4.457
	(0.14)	(0.22)	(0.20)	(–0.64)	(1.02)
Real GDP growth rate	–0.349	–0.260	–0.429	–0.442	0.180
	(–0.70)	(–0.54)	(–0.87)	(–0.93)	(0.25)
EM return	–0.108	–0.111	–0.096	–0.079	–0.301
	(–1.06)	(–1.09)	(–0.96)	(–0.50)	(–1.48)
World return	0.184	0.219	0.176	0.162	0.618**
	(1.43)	(1.67)	(1.38)	(1.31)	(2.41)
US TB return	7.371**	7.992**	6.936**	6.923*	1.626
	(2.28)	(2.37)	(2.21)	(1.75)	(0.28)
Global VIX return	0.010	0.013	0.009	0.019	0.029
	(0.81)	(1.03)	(0.74)	(1.68)	(1.34)
Firms fixed effect	Yes	Yes	Yes	Yes	Yes
Time–fixed effect (days)	No	Yes	Yes	Yes	Yes
Time × Industry fixed effect	Yes	No	No	No	No
Number of firms	832	684	832	773	85
Number of observations	47,360	40,427	47,439	32,637	10,540
Adjusted R^2 (within)	0.0174	0.0183	0.0176	0.0184	0.0429

Table 7: Dealing with the possibility of a false experiment

This table reports the regression results of the following specification run for the years 2010 and 2014:

$$NTSMC_{it} = \beta(Cyclical\ effect) + \boldsymbol{X}.\delta + \boldsymbol{\gamma_i} + \boldsymbol{\delta_t} + e_{it}$$

All the variables are as previously discussed in notes to Table 3, and Appendix I. *Cyclical effect* is the interaction of a dummy created for the period March 16 – June 29 for the *Year 2010* and *Year 2014* models with the treated group ($TRMT\_GRP$). The period is the same as the *GAAR* dummy for 2012 in the previous regressions. $TRMT\_GRP$ is the dummy for the treated group of firms having greater than the median value of the net trading sector exposure combined for January and February for the years 2011 and 2013, respectively. $\boldsymbol{X}$ reflects the set of control variables defined in Appendix B. $\boldsymbol{\gamma_i}$ and $\boldsymbol{\delta_t}$ is the vector of firm and time dummies controlling for firm and time–fixed effect. e_{it} is the error term. Standard errors are corrected for double clustering at the firm and time (day) levels. *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively. The sample period ranges from January 1 – June 29 of 2010 in Model I and 2014 in Model II.

	Year 2010 I	Year 2014 II
$Cyclical\ effect$	0.420	0.166
	(1.62)	(0.82)
Firm return	0.337***	0.150***
	(9.95)	(9.30)
NSE return	0.389***	0.0252
	(2.78)	(0.34)
NSE volatility	–0.259	–4.212***
	(–0.33)	(–4.95)
USD volatility	1.392	–3.215**
	(0.73)	(–2.06)
Real GDP growth rate	2.006***	1.703**
	(3.00)	(2.18)
EM return	0.202	0.168
	(1.25)	(1.58)
World return	0.143	–0.261
	(0.80)	(–1.44)
US TB return	1.330	3.144
	(0.45)	(0.52)
Global VIX return	0.013	–0.021*
	(0.75)	(–1.84)
Firms fixed effect	Yes	Yes
Time–fixed effect (days)	Yes	Yes
Number of firms	848	830
Number of observations	36423	44213
Adjusted R^2 (within)	0.0122	0.0124

Table 8: Post–GAAR uncertainty

Panel A is similar to Table 1. For the one–day window, the *Post–GAAR Period* is June 28, and the *Post–GAAR Eradication* period is July 2 2012. The pre–window of *Post–GAAR Period* ranges from March 19 – June 29 2012, and the *Post–GAAR Eradication Period* ranges from July 2 – September 28 2012. Panel B reports the results of different specifications of the following equations:

$$NTSMC_{it} = \beta_1 \times GAAR\ Eradication + \boldsymbol{X}.\delta + \boldsymbol{\gamma_i} + e_{it}$$

$$NTSMC_{it} = \beta_1(GAAR\ Eradication \times TRMT\_GRP) + \beta_2 \times Post - GAAR + \boldsymbol{X}.\delta + \boldsymbol{\gamma_i} + \boldsymbol{\delta_t} + e_{it}$$

$GAAR\ Eradication$ is the dummy variable which takes the value of one for the post–GAAR period and zero for the post–GAAR eradication period. $TRMT\_GRP$ is the dummy for the firms in the *Treated group*. $\boldsymbol{X}$ reflects the set of control variables. All the variables are defined in Appendix I. γ_i and $\delta_t$is the vector of firm and time (day) dummies and controlling for firm and time–fixed effect, respectively. e_{it} is the error term. Standard errors are corrected for double clustering at the firm and time levels (where specified). *, ** and *** denote statistical significance at the 10%, 5% and 1% significance level respectively.

Panel A: Daily average net equity trading

Window periods	Post–GAAR	Post–GAAR Eradication	Diff	*t*–stat	*p*–value	Observations
1–Day	–0.759	0.121	0.880	2.851***	0.004	766
1–Week	0.098	0.180	0.081	0.586	0.558	3773
1–Month	–0.215	0.092	0.308	4.893***	0.000	16191
2–Months	–0.267	0.053	0.320	7.195***	0.000	32381
GAAR Eradication Period	–0.200	0.072	0.272	7.363***	0.000	50781

Panel B: Regression analysis in post–GAAR uncertainty period

	One–day window	One–week window	One–month window	Two–month window	GAAR Eradication	GAAR Eradication	GAAR Eradication
	I	II	III	IV	V	VI	VII
$GAAR\ Eradication$	1.105***	0.200	0.169*	0.202**	0.194**	–0.344	
	(3.40)	(1.27)	(1.77)	(2.46)	(2.41)	(–1.01)	
$GAAR\ Eradication \times TRMT\_GRP$							–0.110
							(–0.58)
Firm return						0.235***	0.210***
						(13.41)	(12.41)
NSE return						–0.073	0.020
						(–1.19)	(0.34)
NSE volatility						–0.468	0.157
						(–0.48)	(0.22)
USD volatility						0.393	2.528
						(0.13)	(1.02)
Real GDP growth rate						–0.356	–0.081
						(–0.65)	(–0.18)
EM return						–0.104	–0.048
						(–1.03)	(–0.54)
World return						0.176	0.128
						(1.37)	(1.47)
1–Year US TB return						7.350**	3.727
						(2.20)	(0.68)
Global VIX return						0.009	–0.002
						(0.74)	(–0.33)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect (days)	No	No	No	No	No	Yes	Yes
Number of firms	298	510	702	799	874	874	869
Observations	596	3,647	16,095	32,273	50,684	50,684	50,684
Adjusted R^2 (within)	0.0375	0.001	0.001	0.001	0.001	0.0123	0.0123

Figure 1: GAAR Uncertainty Period Timeline

This figure shows the different announcements related to GAAR and the associated uncertainties.

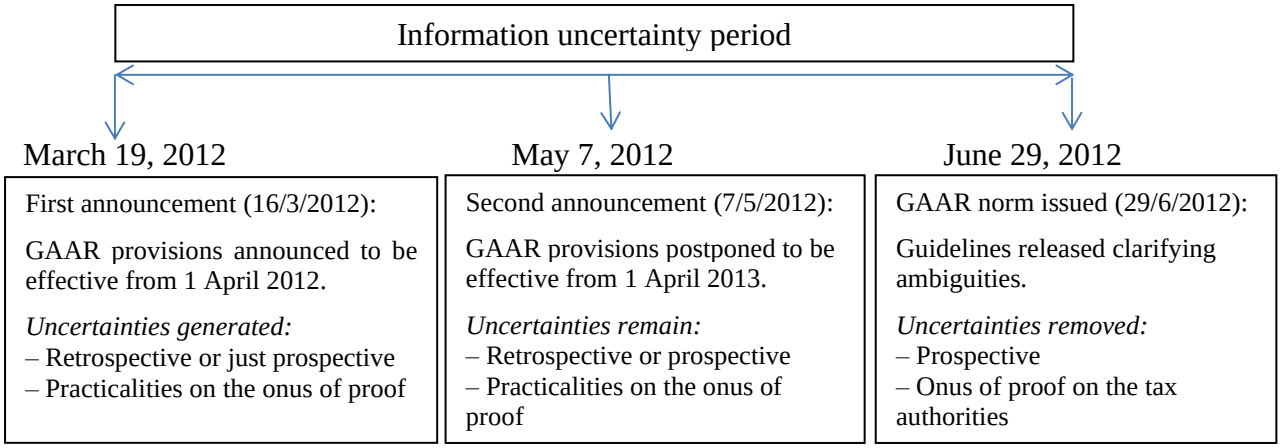
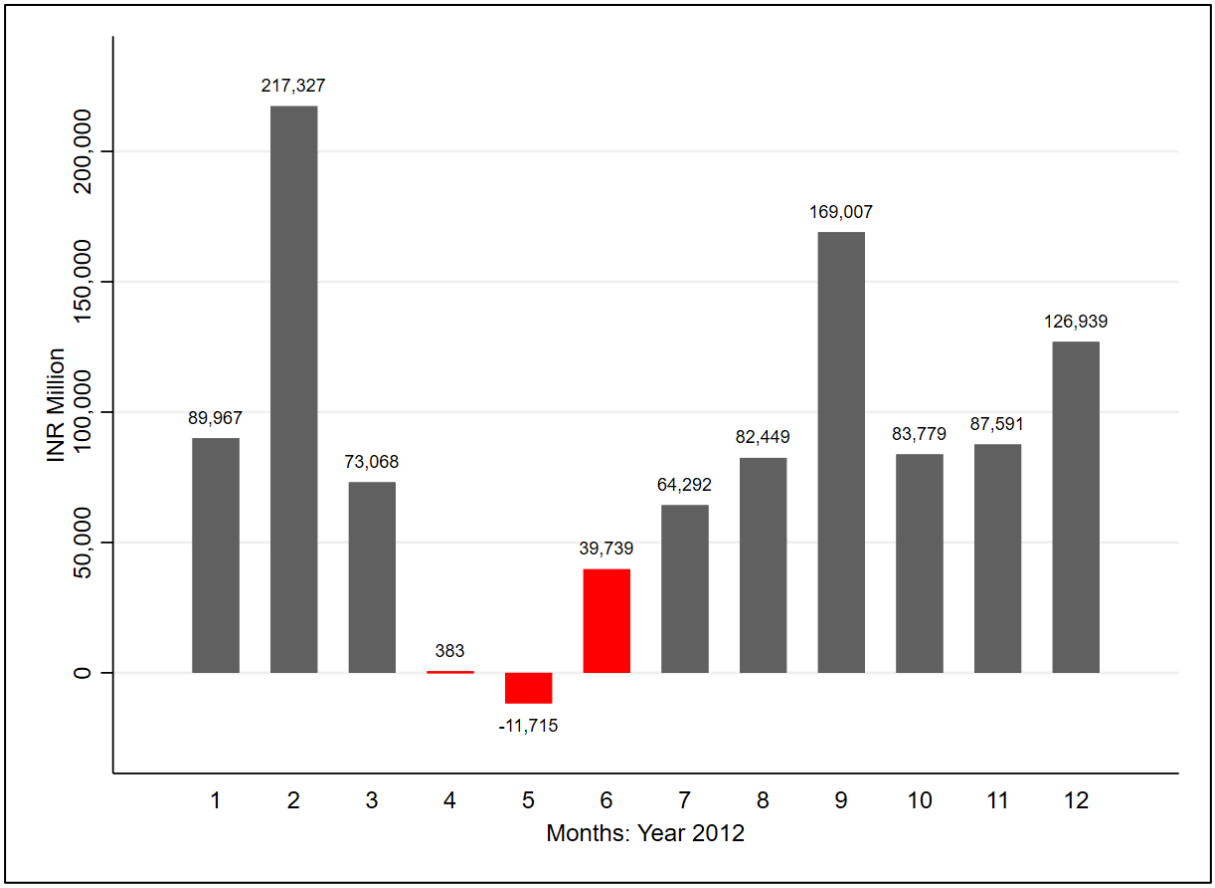


Figure 2: Month–wise total net trading (inflows/outflows) by foreign portfolio investors

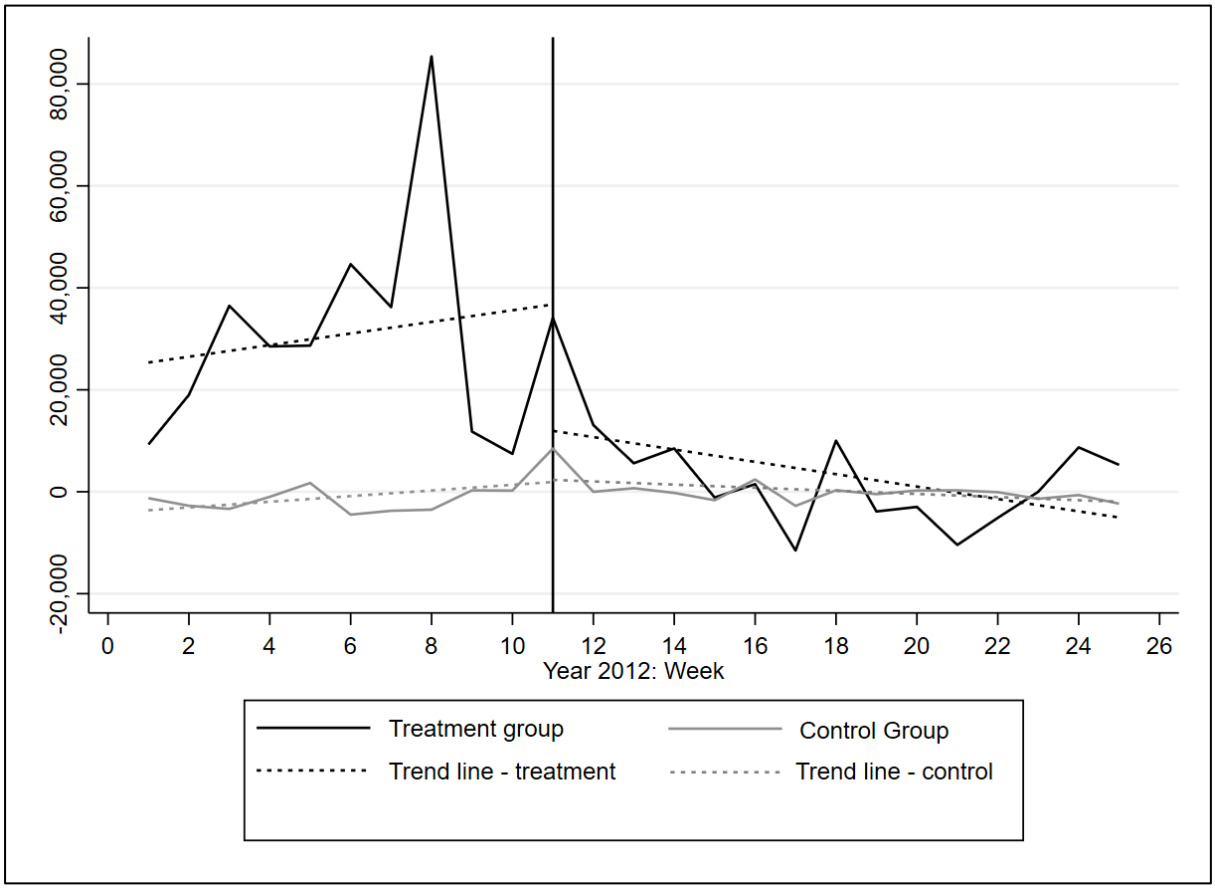
This figure shows the monthly total net trading (purchase – sales) in Indian equities by foreign institutional investors for 2012. Bars with positive figures reflect net inflow and negative net outflow. The red bars denote the period of heightened GAAR uncertainty.



Data Source: Securities Exchange Board of India

Figure 3: Weekly Cumulated Net Transaction Value Pre– and Post–GAAR period

This figure shows the treated and control group's weekly cumulated net trading value (Purchase – Sales) for foreign institutional investors for the pre–GAAR and post–GAAR periods. The pre–GAAR period runs from January 1 – March 16 2012 (Week 1 – Week 11), and post–GAAR runs from March 19 – June 29 2012 (Week 11–Week 25). The dotted line shows the trend line, and the horizontal line represents the week ending March 16 2012 (Week 11).



Appendix A: GAAR background

Khanna (2014)[17] notes that historically nearly 40% of foreign portfolio investments[18] in India flow through Mauritius, the latter being a prominent place for tax planning of global fund houses investing in India. The India–Mauritius double taxation avoidance agreement (agreed in 1983) provides for the taxability of capital gains from the sale of securities in India. However, the local laws of Mauritius, which offer a minimal tax rate, make such transactions tax–free. Such an amicable tax regime has attracted global investors to Mauritius but for potentially the sake of treaty shopping. Further, Munshi (2012b) notes that most foreign investments in the Indian market are made indirectly via funds, promissory notes (P–note), or derivatives mimicking the underlying security. This allows investors to avoid Indian taxes on direct investments, which could be as high as 40%. However, India has been increasingly alarmed about routing third–country investment through Mauritius and the round–tripping of investments leading to the loss of substantial tax revenues.[19] Such loss of payments is also doubted to be routed from other jurisdictions, particularly countries considered tax havens, such as the Cayman Islands, Singapore, Hong Kong, etc.

The issue of tax avoidance also came into the limelight from a controversial deal of Vodafone, a UK–based multinational telecom company, buying an indirect but controlling stake in Hutchison Essar Limited (HEL).[20] HEL was a joint venture in India with Hutchison Telecommunications International Limited (HTIL), which held and operated telecom licenses in India. In 2007, the Dutch subsidiary of Vodafone acquired a stake in HEL from a subsidiary of HTIL registered in the Cayman Islands. This deal accorded Vodafone a controlling stake of

[17] URL: http://www.grantthornton.in/assurance–tax–regulatory–framework/walking–the–extra–mile/ (accessed 12 October 2015).
[18] Munshi (2012a), Financial Times, points out foreign investments constitute nearly 17% of the capitalization of Indian markets (source: Asian Securities Industry and Financial Markets Association).
[19] Munshi (2012a), Financial Times, quote: "…One analyst, who did not wish to be named, gave the example of a politician routing money from a Swiss bank through a P–note via Mauritius in order to launder it, and turn it into white money eligible to be invested in Indian equities".
[20] Lamont (2011). "Vodafone warns India tax bill to hit $5bn". FT.com. Retrieved 15 June 2013.

67% of HEL, costing $11.2 billion. Since the underlying asset (i.e., HEL) was located in India, the Indian government claimed that the deal was taxable amounting to roughly $2.5 bn.

Vodafone objected to the tax claim and went to India's Supreme Court, arguing it was a deal between two foreign entities in a foreign jurisdiction. Thus, the Indian government had no right to impose capital gains tax. On January 20 2012, the Supreme Court of India ruled in favour of Vodafone. In the aftermath, the Indian legislature began considering tax reforms to deal with the indirect transfer of shares of an Indian company, where at least 50% of the assets of the transfer (directly or indirectly) are related to investments in India. Although not expected by foreign investors, the GAAR was also the outcome of such an effort by the Indian government.[21]

[21] Crabtree (2012), Financial Times, notes: "But Mr. Mukherjee (Indian Finance Minister) disappointed investors by ploughing ahead with plans to allow the retrospective taxation of certain international transactions, a move in part designed to recover more than US$2 billion of capital gains tax from UK–based telecoms group Vodafone."

Appendix B: Definition of variables

Variable	Definition
Dependent variable	
$NTSMC_{it}$	The day *t* net trading value by all FII scaled by the previous day's market capitalization (in basis points) of listed stocks (*i*) on the Indian stock market.
Main independent variable	
$GAAR\ effect$	Dummy variable that takes the value of one for the GAAR uncertainty period between March 19 2012 – June 29 2012, and zero for the period between January 1, 2012, to March 16 2012.
$TRMT\_GRP$	Dummy variable that takes the value of one for the *Treatment group* and zeroes for the *Control group*. *Treatment group* include firms having greater than the median value of the net trading sector exposure combined in January and February 2012 and the *Control group* otherwise (see Appendix C).
Push and Pull factors	
Firm return	The previous day's return of the firm traded by FII.
NSE return	The previous day's return on the National Stock Exchange (NSE500 index)
NSE volatility	The daily standard deviation estimated using the past 90 days' return on the National Stock Exchange
USD volatility	The daily standard deviation of the USD/INR exchange rate
Real GDP growth rate	The last quarter's real GDP growth rate
EM return	The previous day's return on the MSCI emerging market index.
World return	The previous day's return on the MSCI world market index.
US TB return	The previous day's return on one year US Treasury bill rates
Global VIX return	The previous day's return on the Chicago Board Option and Exchange Volatility
PSM Covariates	
Ln (Total assets)	Log of total assets
Tobin's Q	The sum of the book value of debt and market value of equity divided by total assets
ROA	Return on assets calculated as net profit divided by total assets
Leverage	The ratio of total debt to total equity
Current liability ratio	The ratio of current liabilities to total liabilities

Appendix C: Treatment and comparison group

Sector–based on the two–digit National Industrial Classification of India	Net equity trading value in INR million					Treatment
	Jan	Feb	Jan/Feb	March	April	
Financial service activities, except insurance and pension funding	18,439	88,561	107,001	11,921	8,509	1
Computer programming, consultancy and related activities	17,640	27,958	45,598	16,450	–6,591	1
Manufacture of motor vehicles, trailers and semi–trailers	16,647	8,610	25,257	5,907	7,944	1
Manufacture of basic metals	12,044	10,383	22,427	–3,372	–4,111	1
Manufacture of coke and refined petroleum products	4,864	16,222	21,087	–887	–8,948	1
Civil engineering	8,717	5,778	14,494	–946	–4,942	1
Manufacture of machinery and equipment	5,025	9,228	14,253	–389	–2,440	1
Extraction of crude petroleum and natural gas	4,669	8,831	13,500	–2,980	1,528	1
Manufacture of other non–metallic mineral products	5,220	6,408	11,628	3,476	897	1
Manufacture of pharmaceuticals, medicinal chemicals and botanical products	4,516	6,624	11,140	11,012	5,086	1
Manufacture of tobacco products	4,602	4,131	8,733	10,872	2,480	1
Electricity, gas, steam, and air conditioning supply	2,009	6,653	8,662	1,088	1,457	1
Manufacture of food products	1,748	4,662	6,411	2,118	–303	1
Manufacture of chemicals and chemical products	–1,735	5,753	4,018	5,282	–198	1
Manufacture of other transport equipment	–1,351	4,729	3,377	1,594	1,352	1
Construction of buildings	453	1,103	1,555	–1,157	–349	1
Repair and installation of machinery and equipment	–3,667	4,571	903	4,520	806	1
Manufacture of electrical equipment	–832	1,606	774	375	–306	1
Manufacture of fabricated metal products, except machinery and equipment	–146	817	670	–245	756	1
Manufacture of textiles	131	419	550	319	57	1
Other manufacturing	–593	1,071	478	2,163	–274	1
Mining support service activities	183	144	327	–373	–3	1
Accommodation	86	196	282	–52	24	1
Water transport	231	13	245	–15	–74	1
Mining of metal ores	143	95	238	–376	5	1
Real estate activities	–780	999	219	–751	–519	1
Mining of coal and lignite	19	170	189	–29	–63	1
Sports activities and amusement and recreation activities	184	–20	164	–36	–102	0
Human health activities	98	–26	72	6,590	–56	0
Activities of head offices; management consultancy activities	8	47	55	161	–9	0
Manufacture of rubber and plastics products	–626	676	51	–248	–485	0
Forestry and logging	–	13	13	–	48	0
Manufacture of paper and paper products	–30	40	10	48	160	0
Architecture and engineering activities; technical testing and analysis	6	0	7	6	8	0
Other financial activities	0	1	1	3	2	0

Public administration and defence; compulsory social security	–2	–1	–3	0	56	0
Activities of membership organizations	–2	–21	–22	–7	–	0
Publishing activities	4	–28	–24	276	98	0
Air transport	–23	–11	–34	314	11	0
Travel agencies, tour operators and other reservation service activities	–63	26	–37	29	17	0
Manufacture of wearing apparel	–40	–8	–48	342	144	0
Rental and leasing activities	–23	–49	–72	–62	–	0
Advertising and market research	–9	–138	–147	–4	–1	0
Retail trade, except for motor vehicles and motorcycles	–60	–89	–148	1,362	715	0
Motion picture, video and television programme production, sound recording and music publishing	–168	13	–155	23	–105	0
Employment activities	–41	–132	–172	99	–25	0
Crop and animal production, hunting and related service activities	–165	–113	–278	26	–114	0
Information service activities	–424	144	–279	48	–92	0
Education	–211	–145	–355	–233	–70	0
Land transport and transport via pipelines	–229	–192	–421	–1,105	–980	0
Wholesale trade, except for motor vehicles and motorcycles	–755	–435	–1,191	–240	–170	0
Manufacture of computer, electronic and optical products	–843	–1,301	–2,144	–59	–411	0
Warehousing and support activities for transportation	–2,882	282	–2,600	–673	–1,409	0
Manufacture of beverages	–1,877	–1,749	–3,626	293	2,831	0
Telecommunications	–256	–5,188	–5,444	2,174	–2,140	0