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How Do Small Investors Impact Derivative Markets? Evidence from a Policy Experiment

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1. Introduction

Regulators all over the world have expressed concern regarding participation of unsophisticated small investors, either directly or through unconventional funds, in derivative markets. For example, the US Securities and Exchange Commission in its public statement on pro-active regulation of derivatives issued on December 11, 2015 stated that the "retail investors might find it challenging and diffcult to comprehend and appropriately weigh the trade-offs posed by sophisticated and complex investment strategies.[2] The South Korean market regulator Financial Services Commission recently tightened qualification criteria for participation in derivative markets. One of the key offcials said that the purpose of these regulations was to "prevent retail investors from making reckless investments and incurring huge losses".[3] The qualification criteria included a compulsory education program and a high initial margin.[4] Indian market regulator Securities Exchange Board of India (SEBI hereafter)--recently echoing a similar view, more than doubled the minimum lot size applicable to equity derivatives. A common theme underlying all the above regulatory actions is that small investors are not sophisticated enough to understand the working of derivatives markets, and hence by indulging in "reckless noise trading"[5] in derivatives, such investors not only lose money but also damage market fundamentals by increasing volatility and reducing informativeness of prices.

Despite there being a lot of regulatory and practitioner interest on the issue of the impact of small investors on derivatives market, surprisingly, to the best of our knowledge, very little academic work has been done on the subject. An appropriate economic setting for studying the question under

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[2] Source: https://www.sec.gov/news/statement/protecting-investors-through-proactive-regulation-derivatives.html

[3] Source: https://fimag.fia.org/issues/2014-09/korea-overhauls-derivatives-market

[4] The margin stipulated was 30 million Korean won, which worked out to be USD 29,000.

[5] Aims to define investor behaviour where one trades based on heuristics and beliefs instead of pre-determined strategies.

consideration is one where arbitrarily defined limits govern the entry of small investors and such entry or exit happens a number of times. The rules governing equity derivative lot sizes introduced in India in the year 2010 provide such a setting.

2. Research Design

On 8th January 2010, SEBI issued new rules for determination of trading lots for equity derivatives in India. Hitherto, trading lot sizes were determined by the respective exchanges. The main purpose of the regulation was to keep the minimum contract value of a single derivative contract close to Rupees 400,000. The manner in which the rule was implemented greatly facilitates identification. First, for all stocks with prices between 0 and 50, the applicable lot size was determined to be 8000. Similarly for stocks with prices between 50 and 100, 100 and 200, 200 and 400, 400 and 800, and 800 and 1600 the lot size was determined to be 4000, 2000, 1000, 500 and 250 respectively. Finally, for stocks with price above 1600, the lot size was determined to be 125. SEBI, also specified that the lot sizes would be reviewed once in six months during March and September, and lot size should be adjusted based on average price in those two months. The minimum lot size of those stocks whose average price calculated as per rules cross the threshold limit from below are required to be cut by 50%. In case the threshold is breached from above, the lot size is doubled. While the downward revision is carried out immediately, the upward revision is done with a lag of three months.

The identifying assumption we make is that an average stock that barely crosses any of the six thresholds from below (treated) is unlikely to be systematically different on unobservable characteristics when compared to an average stock that comes close to the threshold but fails to cross the same (control). Note that there are six thresholds and eight revisions in our setting. We cannot think of a confounding factor that systematically varies between stocks that are close to each other in terms of price but fall on the opposite sides of the threshold. The setting, therefore, lends itself nicely for regression discontinuity (RD henceforth) test. We use robust regression discontinuity design developed by Calonico et al. (2014) in order to examine the impact of entry of small investors on the functioning of the derivatives markets. Irrespective of the threshold used, the lot size is changed when the gross contract value reaches Rupees 400,000 from below. Therefore, in our RD tests, we use the gross contract value of a lot as the running variable with Rupees 400,000 as the cut-off.

The broad idea underlying the measures we use is the following: if prices are effcient, then market wide events are likely to be priced in quickly. In such a scenario, after controlling for the impact of contemporaneous market returns (NIFTY50), lagged market returns are not expected to explain current stock returns in a significant way. In case they do, then it is a sign of ineffciency. We find that price effciency of treated stocks increases by 5.9% (5.8%) in the spot (derivatives) markets.

Finally, we move on to test the impact of entry of small investors on volatility. If the concerns expressed by the regulators are correct, then one would expect to see an increase in volatility. We test the impact on volatility using the volatility measures used in Das et al. (2014). Surprisingly, we detect a marginal increase in standard deviation of returns in derivative markets and no significant change in other measures such as skewness and kurtosis. All measures of volatility remain unchanged in the spot market.

3. Data and Sample Construction

We obtain our data from:

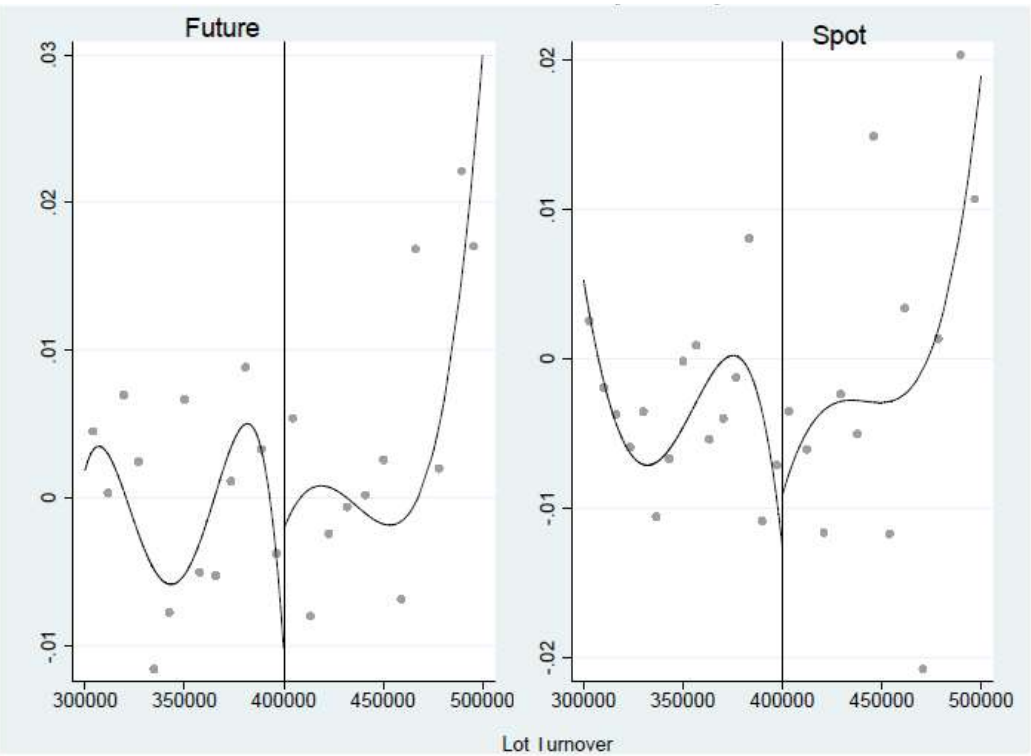
1) National Stock Exchange: More than 85% of the derivative trading in India is executed at the NSE. We obtain all price and turnover information from NSE. NSE also provides information about the list of stocks that were eligible for trading in the derivative segment at any point of time. We use the above information to identify our treatment and control groups. Finally, from the NSE, we also obtain data regarding the trading volume executed by different category of traders at stock-day level in the derivative segment. Traders are categorized into five categories, namely retail, domestic institutional, foreign institutional, corporate and proprietary. We consider the last four categories as institutional traders.

2) Center for Monitoring Indian Economy (CMIE) Prowess: We obtain company-level financial information from Prowess. In particular we collect data relating to sales, capital expenditure, earnings after interest and tax (EBIT), gross value of assets and cash flows.

3) SEBI website: We obtain all relevant SEBI circulars from their web site. From these circulars, we collect information pertaining to lot size rules and changes in them. We also learn about the effective dates of various regulations from this source.

4. Empirical Strategy & Results

Our empirical strategy comprises of using the robust regression discontinuity (RD) designed by Calonico et al. (2014).



The horizontal axis represents lot turnover and the vertical axis cumulative abnormal returns accumulated from Day 0 to Day 3.

Impact on Retail Trading: Our first aim is to verify whether trading by retail traders indeed increased because of derivative lot size split. Our hypothesis is that the minimum lot size requirement acts like a hurdle for retail investors and hence, relaxation of lot size requirement leads to entry of retail investors. We observe that the proportion of retail trading is higher by nearly 2.6 percentage points for treated stocks when compared to control stocks. Given that the average retail trading is nearly 40%, this represents an increase of more than 6% in the proportion of retail trade. Hence, results support our hypothesis that the number of traders indeed increases after the split.

Impact on Futures' Market: We try to examine the impact of split in derivative lot size on derivative price and price of underlying stock. We have multiple events per firm and in total 141 firm-events carried out across eight different periods. Our results clearly show that the stocks that

are on the immediate right of the cut-off (of 400,000) yield a higher positive Cumulative Abnormal Return[6] (CAR) when compared to stocks that are on the immediate left. Using a 3 (5) day CAR, we find that stocks that barely cross the threshold outperform those that barely miss the threshold by 2.8% (3.3%). Given that stocks on both sides are comparable and we have accounted for firm specific and event specific characteristics, it is reasonable to infer from the above results that entry of small investors indeed adds value to the derivative market.

Impact on Spot Market: The derivative lot size split is limited to the derivative markets and no changes were made in the spot markets. However, new entrants to derivatives markets may engage in hedging or speculative trading strategies that involve taking simultaneous but opposite positions in spot and derivative markets. Second, market makers in the derivative markets may take positions in the spot market in order to hedge their positions (Hu, 2014). This can lead to increased activity in the spot segment because of increased derivative activity. Finally, any one sided move in the derivatives markets may attract arbitrageurs into the spot market and hence lead to increased trading activity[7]. We find that the stocks that barely cross the threshold from below outperform stocks that barely fail to cross the threshold by 2.3%. The results clearly show that the impact of entry of small investors spills over to the spot markets and affects the spot market valuation of the firm positively.

Impact on Market Fundamentals: We also examine the impact of entry of small investors on fundamental characteristics of markets such as price effciency, liquidity and volatility. To test price effciency, we use the methods developed by Hou and Moskowitz (2005). The first measure D1, focusses on the relative explanatory power of current and lagged market returns. The second D2, focuses on the difference in economic magnitude of the influence of current and lagged market returns. We do not observe any significance for D1. However, D2 shows that after the split in lot size, price effciency increases by about 5.8% (5.9%) in derivative (spot) markets. The results show that participation of small investors leads to increased price effciency.

For liquidity, we use two measures--Total turnover and Amihud illiquidity measure. The results show that total turnover increases and Amihud illiquidity factor decreases significantly in derivatives markets. This shows a clear improvement in liquidity in the derivative segment. However, results in

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6 Sum of the differences between the expected return on a stock (systematic risk multiplied by the realized market return) and the actual return often used to evaluate the impact of news on a stock price

7 If a secular upward movement occurs in the derivative markets, then arbitrageurs would go short in the derivative markets and long in the spot markets till prices converge

the spot market are not very strong. While Amihud measure shows an increase in liquidity, the total turnover measure is statistically insignificant.

Our final measure, which tries to capture market fundamentals, is volatility. SEBI while imposing restrictions on trading in derivatives, clearly stated that the purpose of these restrictions is to protect market integrity and reduce volatility. Given that the derivative instruments are complicated by nature, such apprehensions may be even higher for derivative instruments. We test whether volatility indeed increases post the entry of small investors. We use standard deviation, skewness and kurtosis of daily returns as dependent variables for our different regression equations. We find that in derivative markets, skewness and kurtosis measures do not see any change in the post event period as shown by the interaction term. However, standard deviation increases by barely statistically significant but economically insignificant 0.2%. In spot markets, we do not see significant change in any of the three volatility measures that we employ. From the above results, it is reasonable to conclude that volatility does not change significantly post the entry of small investors.

5. Conclusion

Increased use of financial derivatives is often considered as one of the factors that worked as a catalyst during the recent financial crisis (Foster and Magdoff, 2009). This has led to a deluge of regulatory actions and pronouncements with respect to financial derivatives in the recent past. Apart from many structural issues relating to derivatives, regulators all over the world are also concerned about the consequences of participation of unsophisticated small investors in the derivatives markets. These concerns are not limited to paternalistic views about protecting small investors from losses but also extend to market stability and effciency. Therefore, the issue of small investor participation in derivative market has attained immense regulatory attention. Surprisingly however, financial economists have not focused much on this topic. This paper seeks to fill this gap by examining the consequences of entry of small investors into equity derivative markets. Our results suggests that concerns expressed by regulators regarding the “distortionary” impact of small investor participation seems to be misplaced. On the contrary, our findings suggest that entry of small investors is likely to lead to increased valuations both in spot as well as derivatives markets on the back of improved liquidity and price effciency. Measures of volatility do not change significantly.