

Do Derivatives Matter?: Evidence from a Policy Experiment

Deepak Agrawal, K. R. Subramanyam, PrasannaTantri and
Ramabhadran S. Thirumalai¹

1. Introduction

The impact of derivatives on the underlying asset has long been debated by practitioners, researchers and regulators. In a perfect market, derivatives are redundant securities and have no impact on the underlying asset's price. However, in markets with frictions, much like the real world, this need not be the case. Derivatives may impact the underlying asset's price, price efficiency, liquidity as well as volatility. It is not clear in what direction these are affected. Derivatives may have a positive impact on the underlying stock's liquidity as some traders may have to hedge their derivatives positions in the underlying stock market. This increases liquidity of the stock and consequently also impact prices positively. Given the leverage that derivatives afford, they provide a potentially low-cost alternative to trading the stock and hence returns to information production are higher and hence stock prices are more efficient. These suggest that derivatives have a positive impact on stock price, price efficiency and liquidity. On the other hand, derivatives may fragment markets as some traders may prefer trading only on derivatives, thereby reducing liquidity in the stock segment, leading to lower stock price efficiency. Lower liquidity in the cash segment could lead to worse price efficiency as returns to information must be higher to offset the higher transaction costs and so informed trading is lower.

The existing evidence on whether derivatives impact various characteristics of underlying assets is mixed. Researchers have found that derivatives have positive, negative as well as no impact on the underlying asset's price, liquidity, price efficiency and volatility. However,

1 Deepak Agrawal is Associate Director, Applied Statistics & Computing Lab, Indian School of Business (email: deepak_a@isb.edu), K R Subramanyam is KPMG Foundation Professor of Accounting and Associate Dean of Marshall PhD Program, USC Marshall School of Business, Los Angeles, USA (email: krs@marshall.usc.edu), Prasanna Tantri is Senior Associate Director, Centre of Analytical Finance, Indian School of Business (email: prasanna_tantri@isb.edu) and Ramabhadran S Thirumalai is Clinical Assistant Professor of Finance, Indian School of Business (email: ram_thirumalai@isb.edu).

the approach taken by previous studies make their inferences on the impact of derivatives on the underlying asset unclear. To address this issue, we look at an exogenous event, whereby due to regulatory changes by the Securities and Exchange Board of India (SEBI), a number of stocks were excluded from the derivatives segment overnight in July 2012. We examine the impact of this event on the underlying stock's prices, price efficiency, liquidity and volatility.

2. The Regulatory Change

After close of trading on July 23, 2012, SEBI announced that the two existing thresholds for stocks to continue in the derivatives segment were increased. These two thresholds are the Median Quarter-Sigma Order Size (MQSOS) and the Market Wide Position Limit (MWPL). It also introduced a third threshold, the Mean Monthly Turnover (MMT), at the same time. The old and new thresholds are in Table 1. The stated reason for this increase in thresholds was to “curb market manipulation” in illiquid stocks. This announcement of higher thresholds for continuation in the derivatives segment was unexpected, which makes it an exogenous event and gives us clean identification to establish the impact of derivatives on their underlying stocks.

Table 1: Old and New Thresholds for Continued Listing in the Derivative Segment

Criterion	Before July 23, 2012	After July 23, 2012
Market Wide Position Limit (MWPL)	600	2,000
Median Quarter-Sigma Order Size (MQSOS)	0.20	0.50
Mean Monthly Turnover (MMT)	N/A	1,000

Note: All figures are in millions of rupees.

The following day, the National Stock Exchange of India (NSE) announced a list of 51 stocks that did not meet these new thresholds and hence would be excluded from the derivatives segment once the existing set of derivatives expired on their respective expiration dates.² This meant that no new expiration dates would be introduced and the stocks would be excluded completely from the derivatives once the far-month contracts, namely, those expiring on September 27, 2012 expired.

² On the announcement date, there were three expirations available: near-month (expiration date: July 26, 2012), next month (August 30, 2012) and far-month (September 27, 2012).

3. Data

First, we obtain all derivatives' price and turnover information from the NSE website. We cross verify the numbers on a sample basis from multiple sources to ensure data accuracy and integrity. We also obtain the list of excluded stocks, historical MWPL, MQSOS and MMT values from the NSE website. Second, we obtain stock-level market capitalization and turnover, and company-level financial information from the Prowess database maintained by the Center for Monitoring Indian Economy (CMIE). Third, we obtain analysts coverage from Bloomberg. Finally, we get details of the SEBI Order from various SEBI circulars available on their website.

We find that that stocks excluded because of the change in thresholds are smaller in size (measured in terms of market capitalization, revenue as well as total assets) and also less liquid than stocks that continued to trade in the derivatives segment.

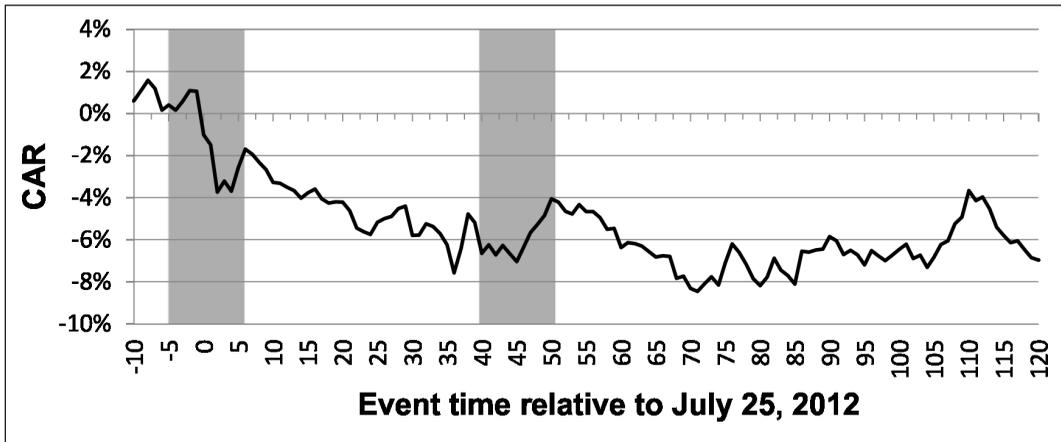
4. Impact on Prices

As a first step, we examine the impact of the exclusion on prices. We use a standard event-study methodology with the CNX 200 Index as a proxy for the market index. Since the NSE announced the list of 51 stocks after close of trading on July 24, 2012, we use the following day, July 25, 2012, as event date (Day 0). While we expect most of the price reaction on Day 0, it is also possible that prices react on the day of actual exclusion (September 28, 2012). We conduct our event study around that date also.

The cumulative abnormal returns (CARs) starting from 10 days before the announcement date is in Figure 1.³ There is a dramatic decrease of 4% in prices around the announcement date, which continues to decrease until the actual exclusion date. There is not much of a price reaction around the actual exclusion date. We examine the CARs beyond the actual exclusion date to determine if the price effects are temporary and prices revert. However, we do not see any reversion in prices even 120 days after the announcement date. This shows that the effect on prices are permanent and not transitory. The decline in prices could be due to worse liquidity in the underlying stock after exclusion of derivatives. Stocks that have low liquidity will trade at lower prices as traders will attempt to recover higher costs of trading by reducing stock price. We examine the impact of exclusion of derivatives on liquidity in Section 6.

³ The shaded regions denote the 11 days around the announcement (July 25, 2012) and actual exclusion dates (September 28, 2012), respectively.

Figure 1: Cumulative Abnormal Returns for all Excluded Stocks



5. Impact on Efficiency

Derivatives offer leverage to investors as they do not have to pay the entire value of the underlying stock when they trade. Additionally, derivative volumes in India are much higher than that of the underlying stock. Hence, investing in derivatives require lower capital and entail lower costs as compared to the underlying, providing an attractive option especially for the informed traders. Excluding derivatives would mean that returns to information acquisition costs must be substantially higher for informed traders to realize positive profits. This will result in fewer informed traders trading in the stock, leading to worse price efficiency.

We find that underlying stock price efficiency worsens after its derivatives are excluded, consistent with our hypothesis. We also find that analysts following the excluded stocks decrease in number, again consistent with fewer informed people following the excluded stocks.

6. Impact on Liquidity

Next, we examine the impact of exclusion on liquidity. One possible impact could be that a number of traders exit the market and this reduces the liquidity in the underlying stocks. For example, derivative traders no longer have to hedge their derivative positions in the underlying stock market and hence liquidity is lower. Alternatively, liquidity could be fragmented between the derivatives and underlying stock segment. With the exclusion of derivatives, all traders are forced to trade in the underlying stock segment, thereby

increasing the liquidity of the stock segment. So it is not clear what impact exclusion of derivatives will have on underlying stock liquidity.

We find that volumes in the underlying stock segment decrease after derivatives are excluded. We also find that the price impact of trades increase after exclusion, which is also consistent with worse liquidity. Further, average trade size and number of trades also decrease, further supporting that liquidity does worsen after derivative exclusion.

7. Impact on Volatility

One of the key concerns regulators have about derivatives is its role in increasing the volatility of the underlying. This is especially true in the case of commodity futures in India. SEBI has from time to time banned futures on some commodities to curtail excess volatility in the underlying.⁴

We examine the impact of derivative exclusion on volatility of the underlying stock prices. We find that volatility appears to increase after exclusion of derivatives. This is contrary to what regulators expect. This increase could be due to worse stock price efficiency after exclusion of derivatives.

8. Conclusions

We examine the impact of exclusion of derivatives on the underlying stock's price, price efficiency, liquidity and volatility. Theoretically, it is unclear how they should be impacted. Regulators tend to view derivatives suspiciously as they can be manipulated easily, given the leverage they afford to traders. We find that derivatives are actually good for the underlying asset. Specifically, stock price decreases, price efficiency worsens, liquidity worsens and volatility appears to increase when stocks are excluded from the derivatives segment. These findings show that the regulators' fear about derivatives are unfounded and derivatives, in fact, can have beneficial effects on the underlying stock.

⁴ See, for example, <http://www.livemint.com/Industry/vF7XAJZ7AieQOmIdt1hZoJ/Sebi-tightens-commodity-derivatives-trading-norms-to-curb-pr.html>

