Do Position Limits in Single Stock Derivatives Benefit Equity Markets?

Pradiptarathi Panda[1], Sitikantha Parida[2], Anjaly B[3] and Latha Chari[4]

Abstract

Market-wide position limits (MWPL) and bans on futures and options (F&O) trading in stocks have been enforced in Indian markets since 2004. However, despite the rapid growth in derivative trading volumes in recent years, questions about the optimal position limits and their impact on market quality remain largely underexplored. During the COVID-19 pandemic, the Securities and Exchange Board of India (SEBI) reduced the MWPL thresholds to 50% of the pre-COVID level to counter systemic risks and extreme market volatility. This regulatory change provides a natural setting to evaluate the impact of changes to MWPL and F&O on market quality in the Indian derivatives market. We find that the changes to MWPL resulted in reduced liquidity and volatility in the spot and futures markets compared to the pre-COVID levels, which declined further during the post-COVID period. However, the volatility in future markets, particularly overnight volatility, was greater than in the spot market during the ban period. The stocks under repeated bans demonstrated significantly higher overnight volatility in futures, while other volatility measures were higher in the spot market. This analysis provides valuable insights into the evolution of liquidity and volatility in the Indian derivative markets during various phases of the pandemic.

Keywords: Position Limits, Single Stock Derivatives, Yang-Zang Volatility, RSY Volatility

JEL Codes: G11, G13, G18

[1] Dr Panda is Assistant Professor (Finance and Accounts) at the Indian Institute of Management (IIM), Raipur, Atal Nagar P. O. - Kurru, Abhanpur, Chhattisgarh, India- 493661. Email- ppanda@iimraipur.ac.in

[2] Dr Parida is Associate Professor at the School of Business, Clark University, 950 Main St, Worcester, MA 01610, United States. Email- sparida@clarku.edu

[3] Dr Anjaly B is Visiting Professor, WSG University, Bydgoszcz, Poland-85229. Email: anjaly.balakrishnan@byd.pl;dranjalybalakrishnan@gmail.com

[4] Dr. Chari is a former Professor and HoD, National Institute of Securities Markets (NISM), Plot No- IS I and IS II, Mohpada, Patalganga, Maharashtra-4210222. *Email- lathachari14@gmail.com*

1. Introduction

It is widely recognised that excessive speculation in derivative markets can distort and amplify volatility in spot markets. In a well-functioning market, stock prices are driven by underlying fundamental factors, such as the expected future performance of the business, which are influenced by factors like new product launches, research and development, and vibrant macroeconomic growth. However, excessive speculation in derivatives has the potential to move prices away from fundamentals, making it hard for investors to make rational investment or hedging decisions (Ross, 1989; Stein, 1987; Bessembinder & Seguin, 1992). This results in misallocation of capital and other such market inefficiencies. In the long run, frequent excessive speculation may discourage genuine investors and hedgers from taking positions. Government and market regulators have implemented various trade-restrictive measures and market surveillance to protect the markets from the ill effects of excessive speculation. These measures include imposing position limits, circuit breakers, price limits, and a ban on trading, among others.

Market Wide Position Limits (MWPL) for single stock derivatives is a regulatory restrictive practice that aims at keeping excessive speculation in single stock derivatives under control by banning the creation of fresh positions in the derivatives segment when they reach pre-defined position limits. This action aims to prevent market abuse and protect the markets from systemic risks that may arise from large open positions in derivatives.

The term "position limits" refers to specifying the maximum quantity or value of positions an investor or institution can create on a given day or period in a specific security. Market Wide Position Limits (MWPL) prescribed by the Securities and Exchange Board of India (SEBI) work differently. It aims at limiting the aggregate open position in both futures and options across all exchanges. If the prescribed MWPL is breached, there is a market-wide ban on creating fresh derivative positions in the specified security, and the existing individuals or entities with open positions are required to bring down the open position to specified levels so that the ban can be lifted[i].
Many studies have analyzed the effectiveness of position limits in curbing speculation and preventing volatility in security. The proponents of position limits support that these position limits create an efficient market by curbing excessive speculation and enhancing market quality (Wei et al., 2015; Dutt & Harris, 2005; Chari et al., 2022). Further, this helps to stabilize future prices and prevent market manipulation (Kyle, 1983; Kumar & Seppi, 1992). Moreover, the regulatory restrictions help to reduce volatility and improve liquidity (Chan et al., 2005). On the other hand, opponents argue that position limits do not help to improve market quality (Kim & Rhee,1997; Chang et al., 2013; Sanders, 2016; Wei et al., 2015; Chari et al., 2022). Further, position limits are ineffective in controlling market manipulation (Gastineau & Jarrow, 1991; Cornwell et al., 2005). Additionally, some studies argue that setting up an optimal level of position limit may help to improve market quality (Dutt & Harris, 2005)

While the broader literature presents mixed findings, most studies have focused on position limits at the level of individual or institutional traders. An important aspect that remains underexplored is the impact of Market-Wide Position Limits (MWPL), which, when triggered, result in a comprehensive ban on futures and options (F&O) trading for the affected stock, thereby impacting all market participants. To the best of our knowledge, research analyzing the effectiveness of MWPL remains limited, particularly in the Indian context, except for Chari et al. (2022).

MWPLs were introduced in India in 2004, coinciding with the early stages of the country's derivatives market. Since then, there have been few modifications to the limits or the criteria triggering MWPL breaches, making it challenging to analyse the effects of any changes to position limits over time.

This study is motivated by the regulatory interventions during the COVID-19 pandemic. In response to systemic risks exacerbated by derivative trading, the Indian regulator temporarily reduced the MWPL for single-stock derivatives to 50% of the pre-COVID levels. After eight months, these limits were restored to their original levels. This provides a unique opportunity to examine the effects of altering MWPL in a natural experimental setting.

This paper aims to evaluate the effectiveness of position limits, specifically examining their impact on market liquidity and volatility when the MWPL was halved and subsequently restored. By analysing the consequences of these regulatory changes in equity spot and single-stock futures markets, the study seeks to fill a critical gap in the literature regarding the role and impact of MWPL on market stability.
When the position limit was reduced to 50% during the COVID-19 period, liquidity and volatility in the spot and futures markets declined compared to the previous period. However, the mean volatility in the futures markets was greater than the spot market throughout the study period. Notably, the overnight volatility in the futures market was significantly higher than the spot market during the ban period. For stocks that were subjected to repeated bans, overnight volatility was again significantly higher in the futures market, while other measures of volatility were significantly higher in the spot market.

Section two of this study presents a brief on the MWPL regulations. Section three reviews the literature, Section four discusses data and methods used in this study, Section five presents the empirical results, and Section six concludes the study with policy implications.

Regulatory Landscape –Market Wide Position Limit

Market-wide position limit (MWPL) refers to the aggregate maximum permissible open positions in the derivative segment of stock across all exchanges (Chari et al., 2022). The trading activity in the market as a whole should not breach the MWPL. The primary objective of this regulation is to curb excessive market speculation in the derivative market. The Securities and Exchange Board of India (SEBI) began enforcing restrictive measures in the derivatives market in 2004, shortly after introducing stock futures and options in the Indian securities markets.
The market-wide position limit (as of October 2024)[ii] prescribed for single stock futures and stock option contracts for a specific underlying stock is defined as lower than of

- 30 times the average number of shares traded daily during the previous calendar month in the relevant underlying security in the underlying segment, or
- 20% of the number of free-float holdings

As per the prevailing regulatory limits, when the aggregate open interest on a particular stock across all exchanges and derivative products reaches 95% of the MWPL, the F&O ban is announced and enforced until the aggregate open position is reduced to 80% of the MWPL.

From a trading perspective, the F&O ban means no fresh positions can be taken, and only existing positions must be unwound. Also, if any stock remains under ban for three months, derivative contracts on such stock will be removed from the market. Over the past decade,

SEBI has utilized MWPL as an essential tool to protect the markets from excessive speculation that may hamper price discovery or result in market manipulation.

Significant alteration to MWPL was done on March 23, 2020, in the wake of widespread uncertainties triggered by lockdown announcements in India and across the globe. SEBI vide press release number PR No.18/2020, dated March 20, 2020, reduced the aggregate open interest trigger level for all stocks on which derivatives trading was permitted from 95% to 50% of MWPL for declaring an F&O ban on the security. The reduced trigger level was enforced from March 23, 2020, and retained until November 2023. This study leverages these regulatory actions as a natural experiment to analyze the effect of changes to MWPL and the resulting F&O ban on the liquidity and volatility of single stock derivatives across spot and F&O segments. The study also identifies the repeated occurrence of F& O bans on stocks (i.e., greater than 10 times) and examines the impact on stock liquidity and volatility.

2. Literature Review

The existing literature on market-wide position limits presents divergent views on its efficacy and impact on market quality. Firstly, we review and classify the literature that supports the imposition of position limits based on their rationale.

Mitigate systemic risks driven by excessive speculation: The primary justification for imposing position limits is that it helps curb excessive speculation, thereby reducing price distortions and systemic risk (Kyle, 1983). Additionally, they argue that limiting excessive speculation position limits helps improve market efficiency by reducing the cost of capital, which the customers generally bear (Krugman, 1996; Merrick et al., 2005; Bernanke, 2006; Davis et al., 2007).

Prevent Price manipulation and reduce volatility: Position limits are also seen as a tool for reducing market manipulation and volatility. For instance, Chan et al. (2005) and Gastineau and Jarrow (1992) highlight that MWPL can reduce price manipulation and enhance market stability by limiting the ability of market participants to influence prices unduly.

Position limits set at optimal levels help improve market quality. Several other studies have found the need to establish position limits at optimal levels. Chang et al. (2013) find that speculative trade positively contributes to price discovery, whereas hedging activity may be detrimental to price discovery. Hence, there is a need to maintain position limits at an optimal level, where they neither adversely affect speculative activity nor compromise market stability. Dutt and Harris (2005) have proposed a model to determine appropriate position limits for cash-settled index derivatives. They suggest that "it is essential to look at the underlying economic rationale for the levels at which position limits are set." Setting a low position limit can hinder the ability of investors and institutions to hedge positions, and very high position limits may provide an opportunity to disrupt the underlying cash market. In the context of the position limit for CSI 300 futures, Wei et al. (2015) suggest that increasing the position limit level helps improve market quality.

Numerous other studies critique the imposition of position limits and present opposing arguments. The imposition of Position Limits may adversely affect market quality. Edwards (1984) and Pliska and Shalen (1991) highlight how such limits can create inefficiencies by reducing market depth and increasing transaction costs. This, in turn, can negatively impact price volatility and overall market functioning. The imposition of a lower market-wide position limit may have increased volatility and liquidity during the COVID-19 pandemic (Chari et al., 2022). The position limit negatively impacts the price discovery in the exchange rate market

(Chang et al., 2013). Similarly, studies find that implementing position limits increases risks and negatively affects the investors and hedgers in the commodity markets (Clifford, 2011).

Impractical and may not prevent market manipulation: Implementing position limits in commodity derivatives is impractical in maintaining liquidity and volatility (Jacobs, 2014). Ap Gwilym and Ebrahim (2013) conclude that the impact of position limits on the US commodity futures market is superfluous and counterproductive. It is worsening the market by causing the deterioration of market efficiency by employing a simple general equilibrium model. Again, a study by Chen et al. (2022) Posits that position limits do not prevent market manipulation and reduce market liquidity.

The existing literature focuses on position limits applied at client or institutional levels. Further, most studies are centered around cash-settled index derivatives. Unlike the above, the MWPL is a market-wide phenomenon. To the best of our knowledge, we have not found studies that have attempted to examine the impact of the market-wide ban on trading in single-stock derivatives based on Market-wide position limits. This study aims to fill this gap by examining the impact of MWPL on liquidity and volatility in both spot and futures markets.

3. **Research design**

Data:

The daily data on stocks that went into the F&O ban was collected from the National Stock Exchange (NSE) of India. For the stocks under the ban, the spot price and volume data (open, high, low, close, shares traded, and shares outstanding) are collected from the Centre for Monitoring Indian Economy (CMIE) prowess database. The futures market price and volume data (open, high, low, close, and open interest) are collected from Bloomberg. With the outbreak of COVID-19 and concerns surrounding it, the position limits for derivatives in single stocks were reduced to 50% from March 2020 to November 2020. The same was revised to 95% when the risk concerns were reversed. Hence, the study period is classified into sub-periods based on the pre-, during, and post-COVID periods. This will help assess the changes to liquidity and volatility arising from regulatory changes that can be captured and examined. The variables used and the study period for both spot and futures are presented in Table 1.

Table No. 1: Variables and Period of Study

Variables Spot	**Variables Futures**	**Period of study**
Open	Open	a. pre-COVID-19 -January 1, 2018, to March 19, 2020. b. During COVID-19 - March 20, 2020, to November 30, 2020, and c. Post-COVID-19 - December 1, 2020, to September 31, 2022.
High	High	
Low	Low	
Close	Close	
Volume and Shares Outstanding	Open Interest	

Source: NSE & Bloomberg

We collect daily data on stocks under the F&O ban from January 1, 2018, to September 21, 2022. The study period is divided into three phases: pre-COVID-19 (January 1, 2018, to March 19, 2020), during COVID-19 (March 20, 2020, to November 30, 2020), and post-COVID-19 (December 1, 2020, to September 30, 2022). It is essential to note that the COVID period is only 8 months compared to the other two periods, which cover 26 months prior to and 21 months after the MWPL limits were restored to the original position.

Table 2: Details of the companies under consideration

Panel A: Number of F&O Ban

		Pre-COVID		During COVID		Post COVID	
	No companies in Ban	No of bans	Days of Ban	No of bans	Days of Ban	No of bans	Days of Ban
Total	79	41	1314	39	762	30	1313

Panel B: Frequency of F&O Ban

	Pre COVID-19		During COVID-19		Post COVID-19	
	No of Companies	no of Bans	No of Companies	no of Bans	No of Companies	no of Bans
<5 Days	20	250	28	318	22	281
>5 Days	21	114	11	444	8	714
Maximum days	31		19		24	
Minimum Day	2		2		2	

Note: The number of companies is the count of unique company names that came under the ban in each period The number of bans is the count of the number of times a company came under ban during each period. This includes repeat bans of the same company multiple times during a given period.

Table 2 presents the number of companies and the ban frequency in three sub-periods. Considering that the COVID-19 ban period was only 8 months, it can be seen that both in terms of the number of companies and the frequency of the ban, it is greater during the COVID-19 period compared to the earlier and post-COVID periods of study. Thus, reducing the MWPL could have brought more companies under the ban and increased the frequency of the ban. However, the maximum number of days for which the company remained banned before it was reversed was reduced to 19 days, and the number of instances when companies were banned for more than five consecutive days also decreased drastically during the COVID period, when the MWPL was reduced to 50%.

Measures of Liquidity and Volatility

The liquidity and volatility measures used in the study are described here.

a) Liquidity measures

The liquidity measures used to measure liquidity in the cash market of the underlying stock include Amihud Illiquidity and the Turnover ratio. They are calculated per the details provided in Equations (i) and (ii).

Amihud illiquidity

$$Amihud\ illiqudity = Average\left(\frac{\lfloor r_t \rfloor}{Volume_t}\right) - - - - - - - - - - - - (i)$$

Where,

$\lfloor r_t \rfloor$= absolute return of the day t

$Volume_t$= product of closing price and the number of shares outstanding in rupees

Turnover ratio

The turnover ratio used in this study is presented in equation *(ii)*

$$Turover\ ratio = \ Average\left(\frac{shares\ traded_t}{shares\ outstanding_t}\right) - - - - - - - - - - (ii)$$

Where, $shares\ traded_t$= Number of shares traded for the respective companies under consideration on the day.

$shares\ outstanding_t$= The number of shares outstanding for the respective companies under consideration on day t.

Liquidity Measures for the Future.

- **T**he liquidity measure used to examine the liquidity of futures markets is outlined in equation (iii). Furthermore, we estimated overnight and close returns on the first day of the ban, along with the average of open-to-close and overnight returns, as presented in equations (*iv*) to (*viii*), respectively.

$$Liquidity\ measure\ for\ future = \frac{Changes\ in\ OI}{1st\ day\ Opening\ Interest} - - - - - - - (iii)$$

We further calculated the overnight and open-to-close changes through the following measures.

i. $$ON\ 1 = In\left(\frac{o_t}{c_{t-1}}\right) - (iv)$$

Where, ON1= overnight return of first-day ban;

ON average, Average overnight return in the ban period

ln=natural logarithm;

o= opening price on day t;

c_t= closing price on day t;

c_{t-1}= closing price on day t-1,

Avg= Average

b) Volatility measures

The study uses well-established volatility measures, such as the RSY volatility and the Yang-Zang volatility measure, to measure the stock's volatility during the ban phase.

RSY Volatility

RSY volatility considers the open, high, low, and close data as inputs to the volatility model. Hence, it captures the volatility profile during the day once the markets open till the close. Rogers, Satchell, & Yoon (1994) volatility is known as RSY volatility, presented in equation (*viii*)

$$\delta RSY = \sqrt{\frac{1}{T}\sum_{t=1}^{T}(\ln\left(\frac{h_t}{c_t}\right)\ln\left(\frac{h_t}{o_t}\right) + \ln\left(\frac{l_t}{c_t}\right)\ln\left(\frac{l_t}{o_t}\right)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (v)$$

Where, $\delta^2 RSY$ = RSY volatility

h_t= High price of the respective company on day *t*

c_t =Close price of the respective company on day *t*

o_t=Open price of the respective company on day *t*

l_t=Low price of the respective company on day *t*

vi. Yang-Zhang volatility

It can be seen that the RSY measure fails to recognize the changes in the stock prices after the markets close and on opening. i.e., the close-to-open overnight volatility that may occur due to events occurring after the market's close.

Hence, the study uses the popular Yang-Zang model of measuring volatility. Yang Zhang's volatility is introduced by Yang, D., & Zhang, Q. (2000) and presented in equations (*vi*) to (*viii*).

$$\delta^2 Yang - Zhang = \sqrt{\delta^2} overnight\ vol + k\delta^2 open\ to\ clos\ vol + (1-k)\delta^2_{RSY} - - - (vi)$$

vii. Overnight volatility

$$\delta^2 overnight\ vol = \frac{1}{T-1}\sum_{t=1}^{T}(ln\left(\frac{o_t}{c_{t-1}}\right) - Avg\ In(\frac{o_t}{c_{t-1}}))^2 - - - - - - (vii)$$

viii. Open to close volatility

$$\delta^2 open\ to\ close\ vol = \frac{1}{T-1}\sum_{t=1}^{T}(ln\left(\frac{c_t}{o_t}\right) - Avg\ In(\frac{c_t}{o_t}))^2 - - - - - - - - (viii)$$

Where, $K = \frac{\propto -1}{\propto + \frac{T+1}{T-1}}$

$\delta^2 Yang - Zhang$=Yang–Zhang volatility
$\delta^2 overnight\ vol.$ = overnight volatility
$\delta^2 open\ to\ close\ vol$= open to close volatility
$\propto$= The value of α = 1.34
Avg = Average
In = natural logarithm

Calculating the Yang-Zang Volatility measure involves calculating the overnight and open-to-close volatility. The study examines these two measures separately to understand the impact of volatility better.

4. Results & discussion

The descriptive statistics related to the pre-COVID, during-COVID, and post-COVID periods are presented in Table 3 for both the spot (in Panel A) and futures segments (in Panel B) of the stocks that came under the F&O ban.

Table 3: Descriptive Statistics of the stocks under the F&O ban

Panel A: Spot market - Pre-COVID, during and post-COVID						
	Pre-COVID (count 38)		**During count (35)**		**Post COVID (count 24)**	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Amihud illiquidity	0.00230	0.00159	0.00200	0.00123	0.00070	0.00066
Standard Deviation	0.00000		0.00000		0.00000	
Turnover ratio	0.05113	0.02722	0.03079	0.01794	0.02701	0.02371
Standard Deviation	0.04878		0.03759		0.02059	
HPR	0.00363	-0.00043	-0.00080	-0.00230	-0.00358	-0.00271
Standard Deviation	0.02918		0.02285		-0.00271	
ONI	0.00817	-0.00256	0.01246	0.00252	-0.00577	-0.02039
Standard Deviation	0.05733		0.08101		0.06365	
RSY	0.04527	0.03959	0.03644	0.03129	0.03125	0.02873
Overnight volatility	0.00015	0.00007	0.00018	0.00003	0.00008	0.00004
Open-close volatility	0.00343	0.00182	0.00276	0.00084	0.00127	0.00098
YangZhang	0.19350	0.183	0.17522	0.166	0.16078	0.1582
Panel B: Futures Market - Pre-COVID, During and Post-COVID						
Liquidity	0.00251	0.00142	0.00167	0.00133	0.00591	0.00141
Standard Deviation	0.00394		-0.00809		0.02060	
ONI	-0.00784	-0.00498	-0.00809	-0.00407	- 0.00387	0.00387
Standard Deviation	0.09386		0.05547		0.07532	
RSY	0.04412	0.03724	0.03601	0.02746	0.02852	0.02573
overnight volatility	0.02685	0.00021	0.00539	0.00009	0.00508	0.00010
Open close volatility	0.00754	0.00168	0.00460	0.00055	0.01466	0.00069
Yang Zhang	0.18996	0.17384	0.00460	0.00055	0.16632	0.14894

Note: ON 1 =, the overnight returns on the first day of the ban. HPR measures the ban period stock price returns. Overnight Volatility and Open-close Volatility are decomposed parts of Yang-Zang Volatility measures. We multiplied the Amihud illiquidity ratio by 10^(-8) for better readability. The standard deviation of the means is shown in the rows below each measure.

The data shows that the price impact of liquidity, as measured by the Amihud illiquidity ratio, declined during the COVID period (from 0.0023 to 0.0007) and thereafter. However, the turnover ratio, which measures the volume of trading, also shows a decline during the COVID and post-COVID period for stocks under the F&O ban.

In contrast, the liquidity measure for the futures segment of the banned stocks also declined during the COVID period, when the MWPL limits were reduced, and subsequently improved once the limits were reversed in the post-COVID period. This may indicate a response to regulatory changes in the market.

The spot market volatility measures using RSY volatility and the open-close volatility have fallen steadily across the study period from pre- and post-COVID periods. However, the overnight volatility was maximum (at 0.00018) during the Covid period. In the futures market, all volatility measures will decrease during the COVID period compared to the pre-COVID period.

As regards the mean overnight changes to prices of stocks that came under the F&O ban on the first day of the ban, the mean returns increased in the spot market during the Covid period and turned negative in the post-COVID period in the cash market. In contrast, in the futures segment, the overnight returns of the stocks under ban have shown a mean negative return in both the pre-COVID and COVID periods. The HPR indicates that, on average, the prices of the stocks fell during the F&O ban period, as the mean HPR was negative during the COVID and post-COVID periods.

To infer the significance of the mean differences across the periods, paired t-tests were conducted. The test results are presented in Table 4.

Table 4: Liquidity and Volatility – Significance of differences across periods.

Panel A Spot Market							
		Pre COVID vs During COVID		During COVID vs Post COVID		Pre COVID vs Post COVID	
Amihud illiquidity	Mean	0.00226	0.00201	0.00201	0.00070	0.00226	0.00070
	t Stat	0.48240		3.0057**		5.4336**	
Turnover ratio	Mean	0.05113	0.03079	0.03079	0.02701	0.05113	0.02701
	t Stat	2.0846**		-0.26930		2.8083***	
RSY	Mean	0.04527	0.03644	0.03643	0.03125	0.04527	0.03125
	t Stat	1.7581*		1.3493*		3.2049*	
Overnight volatility	Mean	0.00015	0.00018	0.00018	0.00008	0.00015	0.00008
	t Stat	-0.25910		0.98810		1.6417*	
Open to close volatility	Mean	0.00343	0.00276	0.00276	0.00127	0.00343	0.00127
	t Stat	1.25590		2.8640**		2.8640**	
Yang-Zhang	Mean	0.19349	0.17522	0.17521	0.16077	0.19349	0.16077
	t Stat	1.7897*		1.5746*		3.3339**	
HPR	Mean	0.00363	-0.00008	-0.00008	-0.00357	0.00360	-0.00357
	t Stat	0.63130		0.83440		1.45300	
Panel B: Futures Market							
		Pre COVID vs During COVID		During COVID vs post COVID		Pre COVID vs Post COVID	
Changes in OI	Mean	0.003146	0.00147	0.001473	0.00216	0.00314	0.00216
	t Stat	1.7203*		-1.1515		0.8806	
RSY	Mean	0.049379	0.03255	0.032555	0.02911	0.04937	0.02911
	t Stat	4.1381***		1.6853**		5.3110***	
overnight volatility	Mean	0.002054	0.00184	0.00185	0.00136	0.00205	0.00136
	t Stat	0.1811		0.4327		0.7617	
Open close volatility	Mean	0.005614	0.00294	0.002943	0.00333	0.00561	0.00333
	t Stat	1.8276*		-0.2068		1.0709	
Yang-Zhang	Mean	0.199302	0.168154	0.168154	0.16006	0.1993	0.16006
	t Stat	4.2805**		1.4418		5.9269***	

*Note: ***,** and * represents the significance level of 1%,5% and 10%*

Impact of Regulatory Action on Liquidity

The t-test results show that they are both in the spot and futures market segments. In the futures market, there was a significant decline in liquidity, i.e., the open interest, concerning the stocks under the ban. During the ban period, liquidity will be controlled in the futures market due to the imposition of the ban, as trading is not permitted. However, we can see a fall in liquidity even in the spot market segment for the stocks under the ban. It is important to note that during the period of study, i.e., post-March 2020, Indian stock markets, in general, witnessed a phenomenal increase in turnover both in cash and futures segments across different stocks. However, the fact that liquidity in stocks subject to the ban has declined in the cash and futures segments may be due to the impact of regulatory action, namely the reduction of MWPL.

Impact of regulatory action on volatility

Volatility measures show mixed results. In the spot market segment, the RSY and open-close volatility have generally declined from pre- and post-COVID periods, with significant changes noted in several comparisons. However, overnight volatility increased during the COVID period and remained higher post-COVID than pre-COVID, suggesting increased uncertainty and price fluctuations.

Volatility measures in the futures market, such as the Yang-Zhang volatility, show a significant decline during the COVID period and remain at a similar level post-COVID period. This suggests a reduction in volatility in the futures market over time. The changes to MWPL may have helped to arrest the volatility in the spot and futures market segment.

Further analysis of the overall difference in mean volatility across the spot and futures markets across the 3 periods shows that volatility is higher in the futures market as compared to the spot markets, and overnight volatility is significantly higher in the futures market compared to the spot market during the study period, as shown in Table 5.

Table No. 5: T-test results of spot and future market

Ban period			Spot	Futures	
RSY	79	mean	0.0401	0.0483	0.4817
Overnight volatility	79	Mean	0.0001	0.0038	-2.4112*
Open to close volatility	79	mean	0.0025	0.0081	-1.4131
Yang-Zang volatility	79	Mean	0.1809	0.1838	-0.36

*Note: ***,** and * represents the significance level of 1%,5% and 10%*

Company-wise analysis results

The data shows that 79 companies have witnessed 1246 F&O ban events. Many companies witnessed repeated bans during different study periods, with MWPL triggering repeatedly. The study identified companies that saw over 10 ban events during the study period and examined the volatility impact on these companies' spot and futures segments separately. The study compares spot and future markets for these companies during the ban periods. The results of 18 such companies are presented in Table 6. Out of the 18 companies, four companies did not show any significant difference in volatility across measures.

In the 14 companies, overnight volatility is significant and high in the futures market segment of the stock under the ban. Further, the RSY and Yang-Zang volatility measures show that in 9 out of 14 cases, the spot market volatility is significantly higher. Thus, the volatility in spot markets is higher during the ban period than in the futures segment.

Table No. 6: Company-wise volatility significance

Name of the Company	RSY		overnight volatility		open to close volatility		Yang-Zang volatility	
	spot	future	spot	future	spot	future	spot	future
ADANI ENTERPRISES LIMITED	0.10281	0.03657	0.00008	0.00015	0.00096	0.0006	0.23951	0.16516
	1.12028		-0.96432		0.03574*		1.54939*	
ADANI POWER LTD	0.04714	0.03719	0.00018	0.00122	0.0039	0.00378	0.20127	0.16834
	0.00661**		-1.44218		0.08321		2.13205*	

BALRAMPUR CHINI MILLS LTD	0.04121	0.04185	0.00125	0.00172	0.0019	0.00457	0.19118	0.19421
	-0.20346		-0.2309		-0.8897		-0.24626	
DEWAN HOUSING FIN CORP LT	0.04871	0.05126	0.00026	0.0005	0.00201	0.0022	0.20232	0.20466
	-0.42751		,-2.6664**		-0.40585		-0.24626	
JET AIRWAYS (INDIA) LTD.	0.05814	0.07263	0.00028	0.02134	0.00171	0.03727	0.20441	0.28206
	,-2.30765*		,-2.60986**		,-3.84040***		0.00012***	
JINDAL STEEL & POWER LTD	0.03431	0.10602	0.00017	0.02404	0.00171	0.03727	0.17305	0.30357
	,-2.02259*		0.04344*		,-2.29874**		,-2.7315**	
PC JEWELLER LTD	0.07793	0.06441	0.00055	0.00116	0.0129	0.01323	0.25801	0.2372
	1.88411*		,-1.62175		,-0.21982		1.83042*	
PUNJAB NATIONAL BANK	0.02378	0.02401	0.00007	0.00075	0.0006	0.00129	0.14345	0.14535
	,-0.21399		,-1.12479		,-0.95459		,-0.51196	
RELIANCE CAPITAL LTD	0.05645	0.05771	0.00023	0.00486	0.0044	0.00537	0.21813	0.2257
	-0.18861		,-1.46638*		-0.44573		-0.54312	
STEEL AUTHORITY OF INDIA	0.02893	0.02603	0.00013	0.0002	0.00083	0.00167	0.1581	0.15098
	3.10738**		-3.01389		-0.77644		2.90841**	
BHEL	0.03447	0.02948	0.00009	0.00024	0.00133	0.00096	0.17348	0.16158
	4.0993***		,-2.1932*		2.72537**		4.24474***	
CANARA BANK	0.02387	0.02324	0.00003	0.00008	0.00065	0.0005	0.14257	0.14156
	0.50868		,-2.40681		0.7235		0.28552	
ESCORTS INDIA LTD	0.02506	0.02088	0.00003	0.00008	0.00073	0.00051	0.14486	0.13268
	2.813**		,-1.87234*		2.57616*		2.76696**	
INDIABULLS HSG FIN LTD	0.03581	0.0341	0.0001	0.00014	0.00208	0.00153	0.17605	0.1717
	1.42894*		,-1.72212*		1.99422*		1.54833*	
VODAFONE IDEA LIMITED	0.05402	0.04557	0.00037	0.00059	0.00399	0.00385	0.21485	0.19789
	2.74981**		,-1.97665*		0.09167		3.1700***	
NATIONAL ALUMINIUM CO LTD	0.03021	0.02581	0.00022	0.00025	0.00089	0.00063	0.16221	0.14998
	3.72540**		-0.278157		1.54579*		3.64181**	
SUN TV NETWORK LIMITED	0.02724	0.02513	0.00007	0.00008	0.00063	0.00037	0.153	0.14689
	0.08463*		,-0.2006		3.14556**		1.4459*	
IDBI BANK	0.03143	0.02926	0.00014	0.00242	0.0014	0.00331	0.16631	0.16903
	0.9669		,-1.40194		,-1.15170		-0.4066	
Mean	0.043418	0.041731	0.000236	0.003323	0.002368	0.006606 1	0.184598	0.18603

*Note: ***,** and * represents the significance level of 1%,5% and 10%*

5. Conclusion

The study examines the impact of changes in Market-wide position limits (MWPL) and bans on F&Os on liquidity and volatility of stocks across three time periods. In the first period, the MWPL was set at 90%. During the second period, it was reduced to 50% of the original limit, and in the third period, it was restored to its initial level.

We find that during the second period (when the MWPL was reduced to 50% of the original levels), liquidity declined in both the spot and futures markets. The liquidity was largely restored once the MWPL limits were reversed. Volatility also reduced when MWPL was reduced, although the overnight volatility increased in the futures market segment during this period. Hence, it may be inferred that the F&O ban may contribute to overnight volatility. The stock-wise study with respect to stocks that went under repeat bans also mirrors similar results. Analysis of the holding period returns during the ban period shows that the stocks display a fall in returns during the ban period. A repeat F&O ban means that the MWPL limits were triggered due to high open interest in these stocks. While the study has not analyzed the stock-specific events during the ban period, it is seen that most of these stocks faced corporate governance or regulatory issues during the ban period. An analysis of the reasons for stocks going under repeated F&O bans may be useful.

This study only considers the spot and futures market segments. However, MWPL measures the open positions across both futures and options. As these derivative products are structured differently in terms of risk, return, and capital requirement, it may be a good practice to measure the open positions for option contracts separately. Also, the MWPL criteria ignore hedge positions. Hence, when stocks face price-sensitive events, MWPL may be triggered repeatedly, as most investors may attempt to hedge against those risks. Further, the reason for repeat bans more than 10 times across 18 companies in the sample require further study so that MWPL limits can be optimized considering the same.

References

ap Gwilym, R., & Ebrahim, M. S. (2013). Can position limits restrain 'rogue trading? Journal of Banking & Finance, 37(3), 824-836. https://doi.org/10.1016/j.jbankfin.2012.10.025

Bernanke, B. S. (2006). Hedge Funds and Systematic Risk: Chairman's Speech. Federal Reserve Bank of Atlanta's 2006 Financial Markets Conference, Sea Island, GA (May 16).

Bessembinder, H., & Seguin, P. J. (1992). Futures-trading activity and stock price volatility. the Journal of Finance, 47(5), 2015-2034. https://doi.org/10.1111/j.1540-6261.1992.tb04695.x

Chan, S. H., Kim, K. A., & Rhee, S. G. (2005). Price limit performance: evidence from transactions data and the limit order book. Journal of Empirical Finance, 12(2), 269-290. https://doi.org/10.1016/j.jempfin.2004.01.001

Chang, Y. K., Chen, Y. L., Chou, R. K., & Gau, Y. F. (2013). The effectiveness of position limits: Evidence from the foreign exchange futures markets. Journal of Banking & Finance, 37(11), 4501-4509. https://doi.org/10.1016/j.jbankfin.2013.02.033

Chari, L., Panda, P., & Nair, C. K. G. (2022). Regulatory Risk Containment Measures on Single Stock Derivatives: An Impact Assessment. Economic and Political Weekly, 57(20), 77-84.

Chen, W., Hu, B., & Wang, Y. (2022). Do Position Limits on Futures Trading Benefit Commodity Markets? Available at-https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4291752. Accessed on February 10, 2024. https://doi.org/10.2139/ssrn.4291752

Cornwell, B., Chi Cui, C., Mitchell, V., Schlegelmilch, B., Dzulkiflee, A., & Chan, J. (2005). A cross-cultural study of the role of religion in consumers' ethical positions. International Marketing Review, 22(5), 531-546. https://doi.org/10.1108/02651330510624372

Davis, A., Zuckerman, G., & Sender, A. (2007). Hedge-fund hardball: How Amaranth was devoured by its banker, Morgan Chase. Wall Street Journal (January 30).

Dutt, H. R., & Harris, L. E. (2005). Position limits for cash-settled derivative contracts. Journal of Futures Markets: Futures, Options, and Other Derivative Products, 25(10), 945-965. https://doi.org/10.1002/fut.20179

Edwards, F. R. (1983). The clearing association in futures markets: Guarantor and regulator. The Journal of Futures Markets (pre-1986), 3(4), 369. https://doi.org/10.1002/fut.3990030404

Gastineau, G. L., & Jarrow, R. A. (1991). Large-trader impact and market regulation. Financial Analysts Journal, 47(4), 40-51.
https://doi.org/10.2469/faj.v47.n4.40

Gwilym, R. A., & Ebrahim, M. S. (2013). Can position limits restrain 'rogue' trading? Journal of Banking and Finance, 37(3).
https://doi.org/10.1016/j.jbankfin.2012.10.025

Jacobs, H. (2014). The Limits of the Market-wide Limits of Arbitrage: Insights from the Dynamics of 100 Anomalies.
https://doi.org/10.2139/ssrn.2308904

Kim, K. A., & Rhee, S. G. (1997). Price limit performance: evidence from the Tokyo Stock Exchange. the Journal of Finance, 52(2), 885-901.
https://doi.org/10.1111/j.1540-6261.1997.tb04827.x

Krugman, P. (1996). How Copper Came a Cropper: Sumitomo's Robber-Baron Tactics Make the Case for Regulation. Slate-The Dismal Science. Available at-https://web.mit.edu/krugman/www/copper.html

Kumar, P., & Seppi, D. J. (1992). Futures manipulation with "cash settlement". The Journal of Finance, 47(4), 1485-1502.
https://doi.org/10.1111/j.1540-6261.1992.tb04666.x

Kyle, A. S. (1983). A theory of futures market manipulations (No. 64). Center for the Study of Futures Markets, Columbia Business School, Columbia University.

Merrick Jr, J. J., Naik, N. Y., & Yadav, P. K. (2005). Strategic trading behaviour and price distortion in a manipulated market: anatomy of a squeeze. Journal of Financial Economics, 77(1), 171-218.
https://doi.org/10.1016/j.jfineco.2004.10.004

Pliska, S. R., & Shalen, C. T. (1991). The effects of regulations on trading activity and return volatility in futures markets. Journal of Futures Markets, 11(2), 135-151.
https://doi.org/10.1002/fut.3990110202

Rogers, L. C., Satchell, S. E., & Yoon, Y. (1994). Estimating the volatility of stock prices: a comparison of methods that use high and low prices. Applied Financial Economics, 4(3), 241-247.
https://doi.org/10.1080/758526905

Ross, S. A. (1989). Information and volatility: The no-arbitrage martingale approach to timing and resolution irrelevancy. the Journal of Finance, 44(1), 1-17.
https://doi.org/10.1111/j.1540-6261.1989.tb02401.x

Rossi, C. V. (2011). Analysis of CFTC proposed position limits on commodity index fund trading-Robert H. Smith School of Business, University of Maryland.

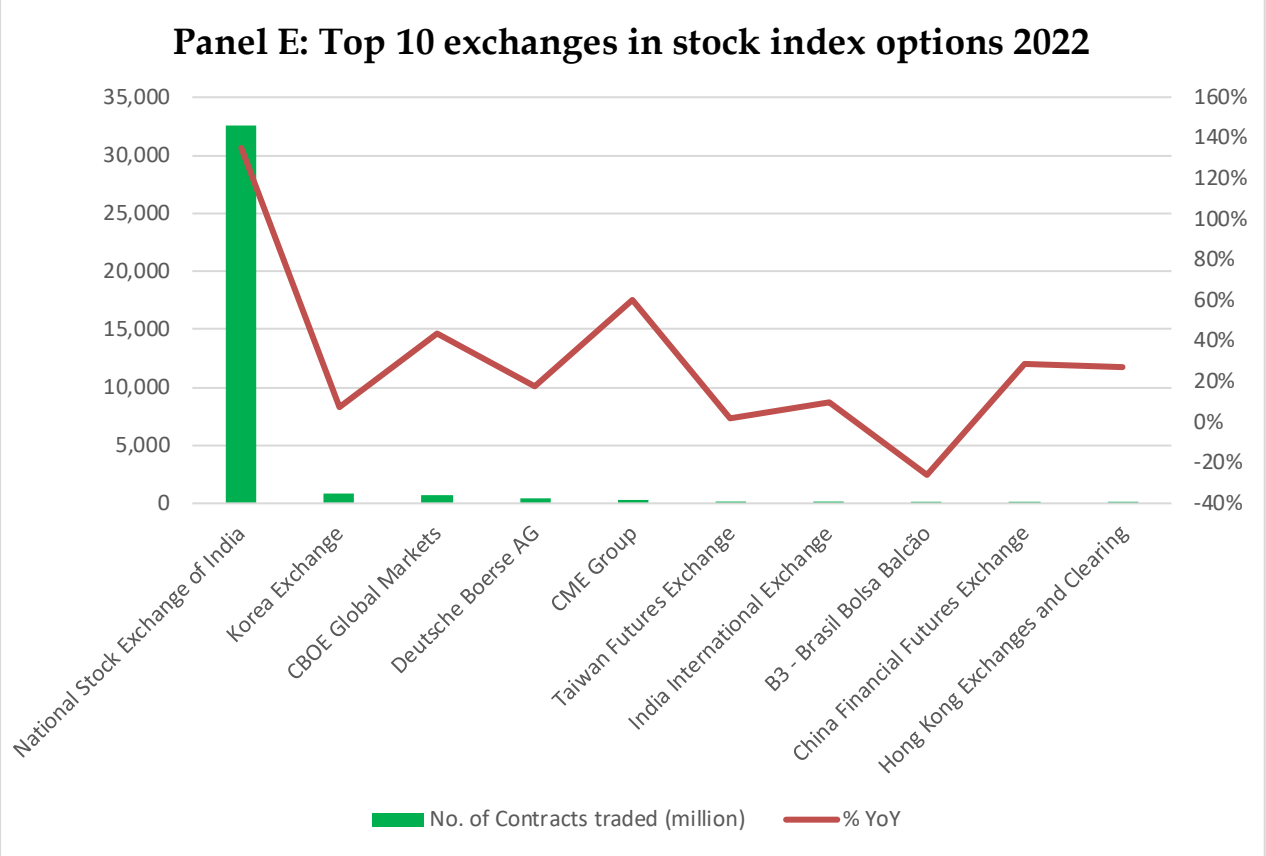
Rossi, C. V. (2011). Analysis of CFTC proposed position limits on commodity index fund trading. Robert H. Smith School of Business, University of Maryland.

Sanders, D. R., & Irwin, S. H. (2016). The "Necessity" of New Position Limits in Agricultural Futures Markets: The Verdict from Daily Firm-level Position Data. Applied Economic Perspectives and Policy, 38(2), 292-317. https://doi.org/10.1093/aepp/ppv019

Stein, J. C. (1987). Informational externalities and welfare-reducing speculation. Journal of Political Economy, 95(6), 1123-1145. https://doi.org/10.1086/261508

Wei, L., Zhang, W., Xiong, X., & Shi, L. (2015). Position limit for the CSI 300 stock index futures market. Economic Systems, 39(3), 369-389. https://doi.org/10.1016/j.ecosys.2015.01.003

Yang, D., & Zhang, Q. (2000). Drift-independent volatility estimation based on high, low, open, and close prices. The Journal of Business, 73(3), 477-492. https://doi.org/10.1086/209650



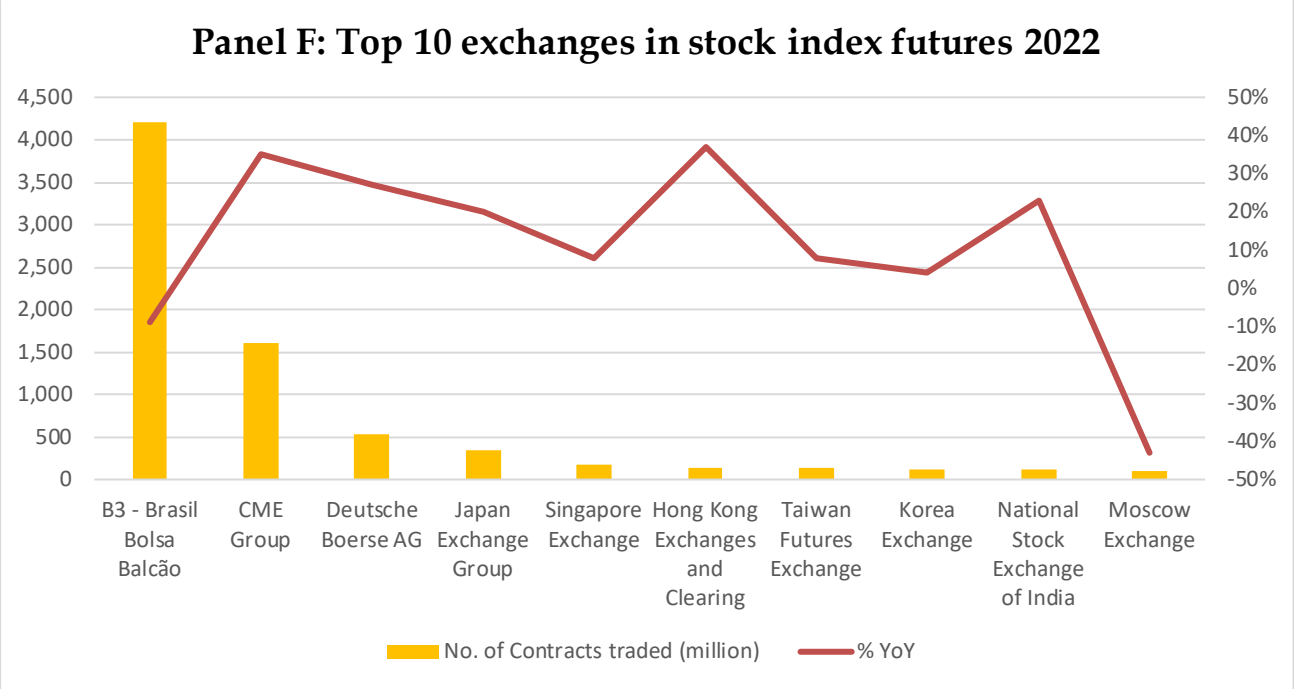


Figure 1: Status of Indian Derivatives Markets

[i] https://www.sebi.gov.in/legal/circulars/jul-2004/risk-containment-measures-position-limits-and-the-broad-eligibility-criteria-of-stocks-and-index-on-which-futures-and-options-could-be-introduced_12781.html

[ii] https://www.sebi.gov.in/legal/circulars/oct-2024/monitoring-of-position-limits-for-equity-derivative-segment_87567.html