

Impact of Suspension of Commodity Derivatives on the Agri Ecosystem

Sarthak Gaurav, Associate Professor (Economics), SJMSOM, IIT Bombay

Piyush Pandey, Assistant Professor (Finance), SJMSOM, IIT Bombay

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Sarthak Gaurav

Piyush Pandey

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List of Abbreviations

ADC	Additional Delivery Centre
APMC	Agricultural Produce Market Committee
BMD	Bursa Malaysia Derivatives Berhad
CBBO	Cluster-Based Business Organization
CBOT	Chicago Board of Trade
CEDA	Centre for Economic Data & Analysis
CFC	Commodity Futures Contracts
DID	Difference-in-Difference
DOCA	Department of Consumer Affairs
e-NAM	Electronic National Agricultural Market
e-NWR	Electronic Negotiable Warehouse Receipts
ETCD	Exchange Traded Commodity Derivatives
FMC	Forward Markets Commission
FPO	Farmer Producer Organization
ICEX	Indian Commodity Exchange
MCX	Multi Commodity Exchange of India Limited
MSP	Minimum Support Price
NCDEX	National Commodity & Derivatives Exchange Limited
NMCE	National Multi Commodity Exchange
NWR	Negotiable Warehouse Receipts
SEBI	Securities and Exchange Board of India

Executive Summary

- Agriculture derivatives, predominantly exchange traded commodity derivatives contracts (ETCDs) plays a crucial role in **price discovery** and **price risk hedging**. Given the importance of agriculture in the Indian economy, deepening of the agricultural commodity markets is of extreme importance.
- **In December 2021, the Securities and Exchange Board of India (SEBI) prohibited commodity exchanges from launching new ETCDs for seven commodities** namely mustard seed (suspended in October 2021), soybean and its derivatives, chana (chickpea), wheat, crude palm oil, moong and non-basmati paddy. Launch of new contracts in chana were suspended in August 2021, as a precautionary measure to against food inflation. Whilst this was not for the first time ETCDs were suspended in India, the prolonged suspension that saw extension of suspension till December 2024, raises several concerns about how it has impacted the agriculture ecosystem ('agri ecosystem' for short throughout the report).
- In this study, we examine **the effect of suspension of trading of ETCDs on agri ecosystem by focusing on five of the seven suspended commodities** namely **mustard, refined soy oil, soybean, chana, and wheat**. More specifically, we intend to examine how price discovery and risk hedging were affected following the suspension of exchange trading. Further, the study aims to explore the relationship between futures and spot prices, volume, and volatility dynamics for each of the commodities under study. Finally, the study wishes to assess how the trading suspension impacted various stakeholders in the commodity value chain.

Study Objectives

The **objectives of the study** are as follows.

- To examine the effect of the suspension of five ETCDs on the agri ecosystem. In particular, we examine how price discovery and risk hedging were affected following the suspension.
- To present commodity-specific variation associated with the suspension and examine the relationship between futures and spot prices, volume, and volatility.
- To understand whether speculation in specific suspended commodities is a matter of concern.
- To gain insights pertaining to futures trading for physical market participants including the farming community whose experiences in the context of futures trading remain understudied.

Data and Methods

- The study relied on time series analysis of **secondary data comprising daily time series on futures prices, spot prices, and retail prices for the select commodities.**
- It also relied on primary data collected through **survey of physical market participants** in three states along with **in-depth interviews** of stakeholders conducted in 2024 to get rich qualitative insights.
- Primary data are based on survey of physical market participants **in three states** namely **Maharashtra, Rajasthan, and Madhya Pradesh** apart from in-depth interviews of several stakeholders including **FPOs** and **CBBOs** as per the commodity and state indicated below.
 - i. Mustard seed (Rajasthan)
 - ii. Refined Soy oil (MP)
 - iii. Soybean (MP and Maharashtra)
 - iv. Chana (MP, Maharashtra, Rajasthan)
 - v. Wheat (MP and Rajasthan).

- Analysis of primary data comprised summarizing the insights from the survey as well as employing probit regression and ordered probit regression to test hypothesis related to the objectives

Main Findings

Results based on Secondary Data

- Empirical findings suggest that in the case of **retail prices of the suspended commodities, there was no fall in retail prices after suspension**, highlighting the importance of both domestic and international demand and supply factors in influencing retail prices of the commodities.
- **Volatility of retail prices and spot prices have increased after suspension for all commodities in general.**
- We find a **causal relationship running from traded volume to spot prices for mustard, soybean and refined soy oil**, indicating **no destabilizing effect of futures trading and spot prices in the pre-suspension period.**
- Trends in the retail prices of suspended commodities as well as their peers suggest that the **suspension was based on the presumption of a positive relationship between commodity futures trading and food inflation, which our analysis finds no evidence of.** Rather, **retail prices remained high for most of the suspended commodities as well as that of the unsuspended commodities in the period after the suspension.**
- The general bidirectionality between futures and spot prices of the suspended commodities suggests that **futures markets played an important role in signaling directionality to the spot markets and the spot markets in turn influenced the futures prices**, thereby providing evidence of an **important role that the ETCs played in price discovery.**
- There is a **marked decline in trading volume for commodity futures that were suspended intermittently and relisted in the past without the suspension having a dent on commodity volumes and prices.**
- **Comparison of the pre-suspension volatility of the ETCs with volatility in the post-suspension period using difference-in-difference (DID) technique — which utilizes variation in average volatility between suspended commodity and non-suspended**

peers before and after suspension reveals no significant difference between the two commodity groups.

- Most specifically, **in the case of soy oil though there is no effect in volatility of the peer group for 3 months and 6 months after suspension, there is increased volatility 12 months post suspension.**
- Speculation ratio (ratio of open interest to volume traded) for none of the commodities studied influence spot prices except refined soy oil, thereby contesting the view that high speculative trading in the futures market leads to higher spot prices.

Results based on Primary Data: Quantitative Study

- Based on the interactions with different categories of stakeholders in the commodity value chain across Maharashtra, Madhya Pradesh, and Rajasthan, the study found that **ETCDs undoubtedly play an important role in price discovery, the absence of which have impaired the process of price discovery of prices for most stakeholders.**
- While the **large agribusinesses have relied on alternative sources of information and market intelligences, other participants namely traders, processors, exporters and FPOs have struggled to find an efficient substitute.**
- While **80% of the survey participants had awareness** about ETCDs, over one-third had experience of commodity futures trading, and over half were knowledgeable about details of the suspension of ETCD trading. Among FPOs and farmers that we interacted with across the three states, there was a **felt need to improve awareness about futures trading.**
- The findings reveal that the **most common primary strategy for price risk hedging for physical market markets has been ETCDs and the suspension has clearly affected them.**
- Among those with experience of ETCD trading, **better price realization** was the most important **first benefit from participation followed by price information.** Regarding the **second benefit from participation, risk mitigation (hedging)** was the most frequent.
- The suspension had a **significant impact on financial stability**, with 36 out of 46 respondents who had experience of ETCD trading reporting either **significant or moderate effects** on this dimension. 42 of the 46 **reported that their risk management practices were notably disrupted.**

- The suspension also affected the **ability to secure fair and stable prices, as well as market access and participation.**
- Nearly **70% reported a rise in operating cost** following the suspension of the commodities.
- Regression results suggest the suspension **significantly affected risk management strategies of the firms** and they relied on **varying strategies or operational adjustments related to grading activities following the suspension**, with aware firms potentially finding ways to mitigate grading cost increases or perceiving these costs differently compared to firms engaged in futures trading.

Results based on Primary Data: Qualitative Study

- **ETCDs undoubtedly play an important role in price discovery in the commodity markets.** Following the suspension of futures trading, actors have found it difficult to arrive at an alternative mechanism for price discovery.
- While the **large agribusinesses have relied on alternative sources of information and market intelligences, traders, processors, exporters and FPOs have struggled to find a convenient substitute**
- **ETCDs helped farmers in not only price**
- Apart from a few exceptions, there is **no overwhelming perception among physical market participants that spot price volatility of the suspended commodities has reduced compared to the pre suspension period.**
- **Volatility is specific to the time period of reference and sweeping generalizations are neither desirable nor prudent.**

Contribution of the study are as follows:

- To our knowledge, this is the **most up-to-date analysis of daily price and volumes series for suspended commodities that throws light on the effect of suspension of ETCDs on the agri ecosystem.**
- The **coverage of commodities covers a larger number of suspended commodities relative to other recent studies that also attempted to examine the effect of suspension on several outcomes of interest through time series analysis techniques.**

- This is the only study that **combines both primary and secondary data** to answer the question of how suspension of ETCDs impacted not only spot and retail price levels but also value chain participation across the commodity value chain.
- The study fills an important gap in the literature in terms of lack of evidence on **the perspectives and experiences of farmers and farmer organizations such as farmer producer organizations (FPOs) in the context of the suspension of commodity futures.**

Policy Suggestions

- In light of the evidence based on our study, it is advisable that the **suspension of the commodity futures trading should be lifted urgently.**
- Given the importance of futures markets in providing efficient price discovery and risk hedging opportunities to market participants, we suggest that **immediate discontinuing the suspension will aid the efforts to deepen the agri derivatives markets and strengthen the integration between spot and futures markets.**
- Since **abrupt suspension of ETCDs affects the prospects of relying upon futures market for price discovery as well as risk hedging, regulatory risks** such as ad hoc suspension affect trust and confidence of the commodity market participants are counterproductive. Therefore, there is a need for adopting a **consultative approach** should be followed to decide policy interventions
- **All commodities should not be treated alike**, and the **relative sensitivity of the domestic retail prices to demand and supply factors** that are influenced by international factors (for those traded internationally), global geopolitics, weather anomalies, supply chain disruptions, and substantive changes in the availability and outlook for substitutes and complementary commodities should be seriously evaluated by the government and research community.
- Inflationary pressures on edible oils have indeed been a major policy concern, and **there is a need for careful analysis of the effect of international price movements and trade patterns.**
- For commodities for which domestic **Mission Support plans have been implemented by the Government of India such as the National Oilseeds Mission, futures trading will help the prices to be discovered domestically** rather than the price signals to be

emanating from international markets only. This allows market participants to increasingly rely on domestic price signals for their decision making rather than on international price signals.

- For commodities whose **prices are inherently linked to the MSP and government's procurement policies, strategies need to take into account the seasonal demand forecasts and support mechanisms that promote transport warehousing and stocking.**
- The lack of evidence on the transmission of price volatility from futures market to spot market for the commodities of interest suggests that there is **no price destabilization of the spot market due to futures trading.** Therefore, distrust on the futures market from the perspective of speculative activities leading to distortion of spot prices is misplaced.
- Given the importance of commodity futures trading for development of innovative agricultural financing alternatives such as warehouse financing, **suspension of ETCs adversely impacts the objectives of the government in that regard. The participation of farmers, FPOs, and cooperatives in the commodity futures markets is low.**
- While exchanges have put in efforts to improve farmer and FPO participation, a **major barrier to higher participation is awareness about futures markets.**
- **Government should put in efforts to train and bring awareness** about commodity futures among farmers and FPOs and cooperatives.

Chapter 1 Introduction

1.1 Introduction

Agricultural commodity futures markets have historically played an important role in enabling price discovery and price risk management. The rationale for trading agricultural commodity derivatives (forwards, futures, and options contracts) emanated from the needs of farmers and traders for a tool for price discovery and hedging price risks associated with spot markets (Dey *et al.*, 2019, Jha and Chakravarty 2021). India has a long history of agricultural commodity futures market that witnessed a revival in the post-liberalization era (Abraham, 2022).

At present, there are four national exchanges in India that trade agriculture commodity derivative contracts. These are: MCX, NCDEX, BSE and NSE. Of these, the MCX has a dominant share in trading of non-agricultural commodities such as energy and bullion such as precious metals and base metals, while NCDEX has a dominant share in trading of agricultural commodities and it is India's largest agricultural commodity derivatives exchanges. These exchanges are regulated by SEBI (earlier it was FMC but it was merged into SEBI in 2015). After the merger of FMC with SEBI, regulations of derivatives markets have strengthened.¹ However, despite the growth of the ETCDs, there have been several episodes of disruption. Frequent restrictions and suspensions by regulators are concern for the development of agricultural derivatives markets as they may result in low trust and poor liquidity in these markets.

A defining feature of the Indian commodity derivatives market is the dominance of non-agricultural trading vis-a-vis agricultural derivatives trading. Based on data till 2015, it has been found that the share of agricultural commodities declined steadily from more than 50% to around 12%, while the share of non-agricultural commodities went up significantly from around 30% to more than 80% (Lingareddy, 2015). Further, a striking feature of the commodity derivatives

¹ The Government of India enacted the Forward Contracts (Regulation) Act in 1952 to regulate the trading in forwards and futures with The Forward Markets Commission (FMC) which was established in 1953 under the Ministry of Consumer Affairs.

market in India is that commodities with relatively small market size have recorded high volumes of trading and vice versa (Kabra, 2007). There is also skewness in the volumes of ETCDs.²

Among the major concerns that have triggered the suspension of futures trading in agricultural commodities at different points of time in the long history of commodity futures in India, the primary concern has been the possibility of food inflation on account of shortages in the spot markets linked to hoarding due to speculation in the futures markets.³ Driven by the same concern, in December 2021, SEBI prohibited commodity exchanges from launching new commodity futures contracts or **exchange-traded commodity derivative contracts (ETCDs)** henceforth) for seven commodities namely Mustard seed, Soybean and its derivatives, Chana (Chickpea or Bengal gram), wheat, Crude Palm Oil (CPO), moong and Non-Basmati Paddy.⁴

Importantly, despite policy imperative to integrate spot and futures markets (Ministry of Finance, 2018), agricultural commodity derivatives trading has been treated with suspicion. Such suspicion has resulted in recurrent regulatory decisions to suspend trading of commodity futures at the exchanges (Saini and Gulati 2017). Whilst this is not the first time that ETCDs were suspended in India, the prolonged suspension that saw extension of suspension till December 2024, raises several questions on how it has impacted the agriculture ecosystem ('agri ecosystem' for short throughout the report). Given the significance of commodity futures trading in the agri ecosystem and the far-reaching implications of agricultural commodity futures markets on welfare of farmers, traders, processors, aggregators, exporters, and other stakeholders in the commodity value chains, **there is an urgent need to understand how the suspension has impacted the agri ecosystem.** In this context, this study attempts to find answers to the following **major questions.**

- Did the suspension of trading of ETCDs attain its goal of curbing food inflation?
- Is there a relationship between spot and futures markets in India?
- Did the latest suspension impact stakeholders in the commodity value chain?

² Sobti (2020) used panel data study of 30 agricultural contracts for the period 2003 to 2016 and found that contracts with small market size had large trading volume and vice versa. Commodities like mentha oil and guar experienced high trading activities while commodities like wheat which has a large spot market saw low futures trading.

³ For a study on how skewed market participation favouring speculators can affect the objectives of price discover for market participants, see Kabra (2007). For relationship between speculation and liquidity, see Ludwig (2019) and Robles *et al.* (2009).

⁴ Launch of new contracts in Chana was suspended in August 2021, as a precautionary measure to against food inflation. ETCDs for wheat were suspended in February 2007.

To find answers to these questions, this study uses both **secondary data** of daily price series of futures, spot, and retail prices for a subset of the suspended commodities along with analysis of **primary data** from a study of participants of the commodity value chain across three states. In the secondary data analysis, we focused on the relationship between spot and futures prices using time series analysis along with analysis of volatility and speculation for the commodities of interest. The analysis of primary data is in the form of econometric analysis of survey data as well as qualitative insights from fieldwork and semi-structured interviews with stakeholders across the commodity value chain.

1.3 Study Objectives

The objectives of the study are as follows.

- To examine the effect of the suspension of five select commodity futures contracts (ETCDs henceforth) on the agri ecosystem.
- To present commodity-specific differences associated with the suspension by examining the relationship between futures and spot prices, volume, and volatility.
- To understand whether speculation in futures markets causes spot prices for the select commodities.
- To gain insights pertaining to futures trading for both the physical market participants as well as non-participants including the farming community whose experiences in the context of futures trading remain understudied.

1.4 Methodology and Structure of the Report

In order to find answers to our research questions and attain the objectives of the study we undertake a comprehensive investigation including both secondary and primary research. The methodology is broadly as follows.

First, we conducted an analysis of secondary data comprising daily time series of futures prices, spot prices, and retail prices to examine whether the suspension of five commodities of interest (excluding moong and non-Basmati paddy from the list of suspended ETCDs) has been

effective in controlling retail and spot prices of these commodities. Informed by extant literature, we also conducted peer-analysis for volatility and speculation. In addition, we also conducted a difference-in-difference (DID) (Abadie, 2005, Mackenzie, 2020) analysis for limited commodities based on data availability to determine the effect of the suspension on volatility of commodity prices in the spot markets. The details of the analysis are presented in Chapter 2.

Second, we relied on primary data that comprised two parts. First, we conducted a survey of physical market participants in three states namely Maharashtra, Rajasthan, and Madhya Pradesh as per the commodity and state indicated below.

- i. Mustard seed (Rajasthan)
- ii. Refined Soy oil (MP)
- iii. Soybean (MP and Maharashtra)
- iv. Chana (MP, Maharashtra, Rajasthan)
- v. Wheat (MP and Rajasthan).

Further, we drew insights based on in-depth interviews of several stakeholders including physical market participants, FPOs, CBBOs and farmer associations in the three states along with fieldwork. The details of the quantitative and qualitative analysis are reported in Chapter 3.

In what follows in this chapter, we present insights from a review of the extant literature regarding different perspectives and evidence on effect of suspension of agricultural commodity futures contracts. In particular, we briefly discuss the evidence on whether suspension of ETCDs has curbed food inflation in the past. As mentioned earlier, Chapter 2 presents evidence from secondary data analysis. Chapter 3 presents findings of the primary research. Chapter 4 concludes with summary of the findings and key policy suggestions.

1.5 Agricultural Commodity Derivatives Trading and Food Inflation

There have been serious concerns amongst policymakers and academics that growing financialization and speculation in futures markets has distorted food prices (Kabra, 2007; Cheng & Xiong, 2014). While several studies in the global context have examined the impact of financialization of commodity markets on food prices (e.g. Yang *et al.* 2005), the evidence is mixed and conflicting in the Indian context.

Ghosh *et al.* (2012) studied three futures at CBOT: wheat, maize and soybean from 1986 to 2011, and did not find liquidity of futures markets having a stabilization impact on spots prices. By contrast, Kamara (1982) found that the introduction of commodity futures trading generally reduced or at least did not increase cash price volatility. The study compared cash market volatility before and after the introduction of futures trading. Nath and Lingareddy (2008) found the price of urad (Black gram) to depend on the price of other substitute pulses as well as its own previous prices. The price rise was inferred to be a general rise due to increases in the price of other food items and other commodities, and not just urad.⁵ A corresponding but relatively slow increase in the prices of pulses was observed as a result of the significant causal association between urad and other pulses. Although gram prices too posted a moderate increase in the post-futures trading period, the impact was not found to be statistically significant. Futures activity was concluded to have had a significant and direct causal influence on urad prices and volatility whereas the same was not statistically significant in the case of gram.

The review suggests that there is lack of consensus in the literature on the relationship between futures prices and food inflation, and that there is considerable heterogeneity across region, commodities, and time.

1.6 Effect of Suspension of ETCs

As described earlier, in India, the agriculture derivatives market witnessed a number of instances of suspension or suspension of ETCs. During the global financial crises, food prices went up and to tackle that the government suspended future trading on eight commodity contracts in 2008 as per the legal mechanisms conferred upon the state through primary acts such as the Essential Commodities Act, (ECA) 1955. Similar actions by the government were seen in 2016 and 2021 in response to surge in food prices. Government's decisions to suspend agricultural commodity derivatives trading to contain food inflation is a consequence of the belief that speculation in futures markets puts upward pressure on spot and retail prices.

There are a few studies on the effect of the commodity derivatives suspension on retail prices. A recent study by Aggarwal *et al.* (2023) analyzed the impact of suspension of chana and

⁵ They also took a dummy variable for presence and absence of futures trading, and found that spot prices of urad and their volatility increased significantly during the period of futures trading.

mustard seed futures trading activity on spot prices. They used data on spot prices from Agmarknet and Ministry of Consumer Affairs whilst for derivatives data, they used data provided by NCDEX. They found no change in price trend even after the suspensions of ETCs in 2016 and 2021. The authors compared the volume of trade with spot prices and found no correlation in both the commodities studied. They constructed a counterfactual using synthetic control method for the post suspension period and found that prices have behaved in the same way had suspensions not occurred. Hence, they found that there is no impact of suspensions of chana and mustard seeds derivatives on prices of Chana and mustard oil prices.

Jacob and Gopalkrishnan (2023) found an adverse effect of the suspension on efficient price discovery. Furthermore, they did not find any evidence of futures trading volume destabilizing the physical market for the specific commodities they studied. They also found that spot prices of the suspended commodities exhibited relatively lower prices compared to what they considered as domestic and international peer groups of commodities. Instead of attributing this decline in prices to the suspension of futures trading alone, they argue that other factors including government intervention on the supply side and export suspensions could also have played a role in putting downward pressure on the prices.

In terms of volatility and co-movement between futures and spot prices, two results of Jacob and Gopalkrishnan (2023) are important. First, they found that the spot price volatility declined for most of the commodities of interest around the suspension of ETCs and that the futures suspension along with other factors reduced volatility spillovers from international commodities markets. Second, they found a decline in the long-term co-movement of commodities in spot markets spread across different markets.

Dey and Gairola (2024) used daily futures and spot price data of three suspended agricultural commodities of pre-suspension sample periods, and found that chickpea, soybean, and refined soy oil futures exhibited high speculative activity and enhanced liquidity while in the post-suspension period, spot price volatility was found to be considerably higher for chickpea and refined soy oil.

Despite studying different commodities and employing different techniques for analyzing the effect of futures trading suspension, there is a unanimous agreement among the most recent studies that prolonged suspension of ETCDs adversely affects price discovery and risk hedging.

1.7 Conclusion

In this chapter, we have presented the objectives of this study along with a summary of the literature on evolution of agricultural commodity derivatives markets and effects of suspension of agricultural commodity derivatives. While no two studies have comparable commodities, datasets, or methodologies, it is evident that in terms of the conclusions that have been drawn about the role of commodity derivatives on volatility and inflation, the evidence is mixed. In recent times, two econometric studies (Aggrawal *et al.* 2023, Jacob and Gopalkrishnan 2023, Dey and Gairola 2024) have rigorously examined the question using updated series to throw light on the effect of the suspension in 2021 as well as 2016. While we have immensely benefited from all the studies in the literature, to the best of our knowledge, this study is novel due to the following reasons.

First, it is the most updated analysis of daily price and volumes series that throws light on the effect of suspension of ETCDs in India. Second, its coverage of commodities covers a larger number of suspended commodities relative to other recent studies that also attempted to examine the effect of suspension on several outcomes of interest through time series analysis techniques. Third, and perhaps most importantly, to the best of our knowledge, this is the only study that combines both primary and secondary data analysis to answer the question of how suspension of ETCDs impacted not only spot and retail price levels but also value chain participation across the commodity value chain. On a related note, there is no evidence on the views and experiences of farmers and farmer organizations such as farmer producer organizations (FPOs henceforth) in the context of the suspension of commodity futures, which is a glaring gap that our study attempts to fill.

Chapter 2 Evidence from Secondary Data: Price Series Analysis

2.1 Introduction

Following a detailed review of the extant literature on agricultural commodity futures and the multifarious effects of suspension of commodity futures contracts (ETCDs) as seen in Chapter 1, in this chapter, we present the results of our secondary data analysis and interpret the findings in the context of trends in commodity prices in both domestic and global markets.

We analyze time series data on daily futures and spot prices as well as volumes **for five of the seven suspended ETCDs, the exceptions being moong and non-basmati paddy.**⁶ Wherever applicable, we also bring daily retail prices into our analysis given the significant concerns about retail food inflation that were pivotal in imposing the suspension on ETCDs in 2021. Furthermore, for obtaining insights on causal effects of the suspension, we present a peer-group analysis which is in the spirit of difference-in-difference analysis (DID), wherein we estimate the causal effect of the suspension (treated as a natural experiment) by taking the difference in means of the suspended commodities and a basket of unsuspended commodities considered as ‘peers’ (both domestic and international) at different points in time: before and after suspension. This allows estimating the effect of the suspension by examining the difference of the average volatility between the suspended and unsuspended commodities before and after suspension period. We have used ‘suspension’ and ‘suspension’ interchangeably and unless otherwise stated, they retain the same meaning.

The rest of the chapter is structured as follows. In section 2.2, we present the data and methods that are used in our analysis. Section 2.3 presents the time series analysis results for the ETCDs of interest that help us estimate the effect of the ETCD suspensions. Section 2.4 discusses the results and summarizes the valuable data-based evidence that will be synthesized with the findings from our primary research as presented in Chapter 3.

⁶ The reason for exclusion of moong and non-Basmati paddy was the low liquidity in moong and non-basmati paddy on the leading exchange at the time of suspension and a lesser immediate concern about the association of these two commodities with food inflation.

2.2 Data and Methods

Daily series for futures prices, polled prices, traded volume and open interest of commodities of interest were provided by NCDEX.⁷ Daily closing prices of 1-month ahead contracts (near month) were chosen owing to higher liquidity. For some commodities such as mustard seed (RM seed), the daily series was as long as 20 years (2003-2022). Wherever applicable, we also analyze retail data that were sourced from CEDA Daily Food Prices Data (see <https://dca.ceda.ashoka.edu.in/>) which was extracted from DOCA, Government of India. We randomly matched entries from CEDA data with DOCA data for confirmation of the series and the two were found to have a one-to-one match. Data on international prices of commodities was provided by NCDEX, which are from multiple sources.

Since specific commodities such as Chana and Wheat have been suspended at different times in the past as well, it is important to understand how suspension influenced volumes of trading and volatility during periods before and after these suspensions also. For the commodities that were suspended for the first time, we provide novel evidence on futures and spot price movements, volatility, speculation, and time series relationships among the variables. For time series tests and plots, all the series have been taken in the form of a 7-day moving average in order to eliminate short term noise. In contrast, for volatility analysis, the series are taken as daily price series.

To understand whether there is any evidence of transmission of futures prices to retail prices which is seemingly the basis for the decision to suspend the ETCDs, we study the relationship of retail prices with their peers: domestic and international. We present the relationship between the variables by plotting them to observe any relative change in price trend after suspension. We performed the stationarity test and used appropriate differencing to convert non-stationary series into stationary before further analysis. We have used time series techniques such as Granger causality test and cointegration to explore the long-run relationships between time series variables.

We measured volatility using simple standard deviation of returns in the form of annualized volatility. We measured speculation by using speculation ratio, which is ratio of open interest and volumes. In addition, we test the claims of market participants that domestic price of soybean oil

⁷ The polled price is the average of the spot prices quoted for select commodities by empaneled polling participants representative of the commodity value chain participants in major commodity production centres. See https://ncdex.com/downloads/Markets/reports/Polled-Price-Quotes/footer/Spot%20Price%20Polling%20Process_05072018.pdf

follows the international price of soybean oil. To verify this insight, the relationship between domestic price and international price of soybean oil has also been explored.

In what follows, we present the results of our analysis that help us assess the evidence crucial to evaluating the effect of the suspension of commodities on the agri ecosystem. We also make use of our review of evidence on the fundamentals for the five commodities of interest for the specific periods of analysis.

2.3 Results of Time Series Analysis

In this section, plots and statistical tests are presented for five suspended ETCDs: mustard, chana, wheat, soy oil, and soybean, sequentially.

2.3.1 Mustard

Trading of mustard (rape-mustard) seed futures on NCDEX (RMSEED) was suspended on 8 October 2021. As we examine if ETCD suspension affected retail prices of mustard oil only or whether the trend was uniform for all the edible oils, we begin by comparing the retail prices of mustard oil and that of its peer edible oils: palm oil (CPO), groundnut oil, soy oil, and sunflower oil as shown in Fig 2.1.⁸

⁸ Retail prices of mustard seed are not available at DOCA, and hence not available in CEDA dataset.

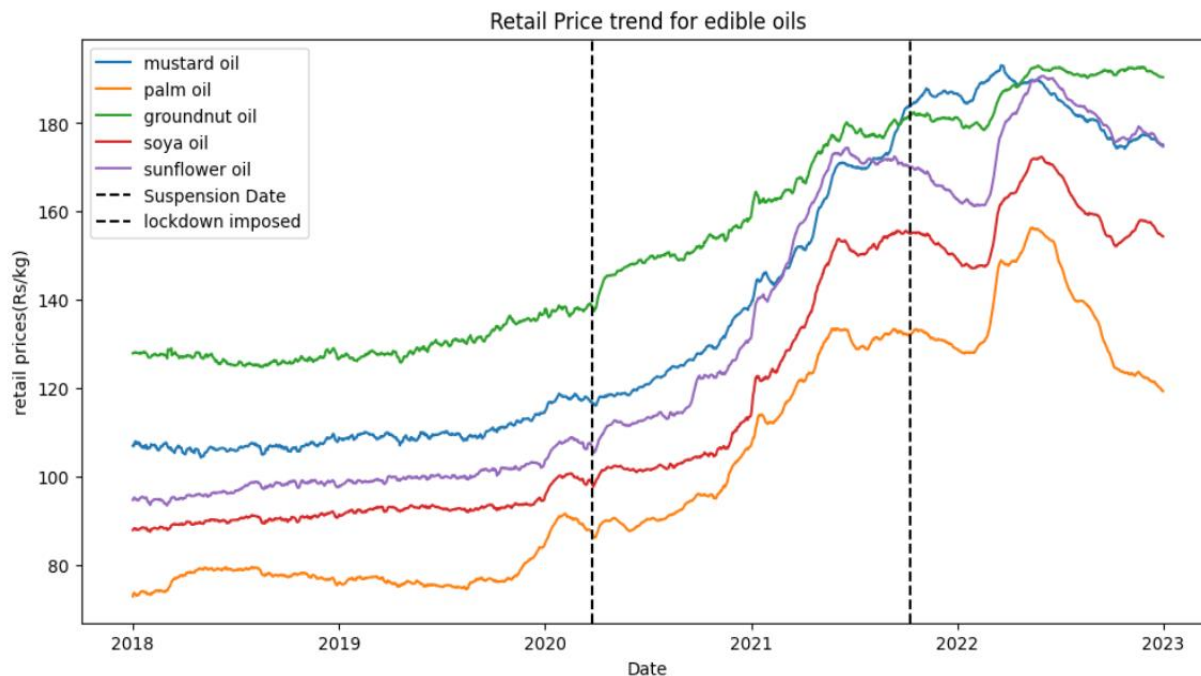


Fig 2.1 Trend of retail prices of mustard and peer oil groups: 2018-2023

Note: The first dashed vertical shows the imposition of lockdown pertaining to COVID-19 pandemic whereas the second dashed vertical line corresponds to suspension of mustard seed futures trading in October 2021. The series is in the form of a 7-day moving average as explained earlier.

It can be seen that mustard oil price that was already experiencing an uptick by the time RMSEED trading was suspended in December 2021, went up further even after the suspension of ETCD until April 2022. Prices continued to remain firm for some time for all the commodities except mustard seed even post suspension. In fact, in case of soybean, soy oil and CPO prices had a sharp rise till April 2022. Post-April 2022, there was a fall in international prices of major commodities such as soybean, soy oil, and CPO. Since, India relies heavily on imports of edible oil, it closely follows the price trend of edible oils in the international market; a theme that we will return to while discussing the trends for soybean complex.

It can be argued that the market sentiments were not necessarily driven by RMSEED futures trading but influenced by the factors relating to supply and demand; where both domestic and international factors played a crucial role. Therefore, it is evident that suspension did not reduce the retail prices of mustard oil while the reduction that was observed six months following the suspension was attributed to other factors. In fact, for the unsuspended edible oil

peers of mustard oil, retail prices dipped for several months before a brief period of uptick and then a steep fall since mid-2022. Similarly, there was a significant uptick in the polled prices of mustard seed as shown in Fig 2.2 following the imposition of the suspension and the upward pressure on spot prices for mustard seed continued all the way till the last day of our series.

Notably, if the logic of ETCD trading leading to retail inflation held good, then the unsuspended commodities whose prices eventually declined to levels of August-October 2021 (corresponding to the quarter preceding suspension of RMSEED trading), had to register a price fall due to factors that are not associated with futures trading but that of supply and demand as evident from the fundamentals that the exchanges document in detail. **Therefore, there is clear indication that factors other than futures trading are likely to play an important role in influencing the levels of retail prices, and our subsequent analysis will elaborate this further.**

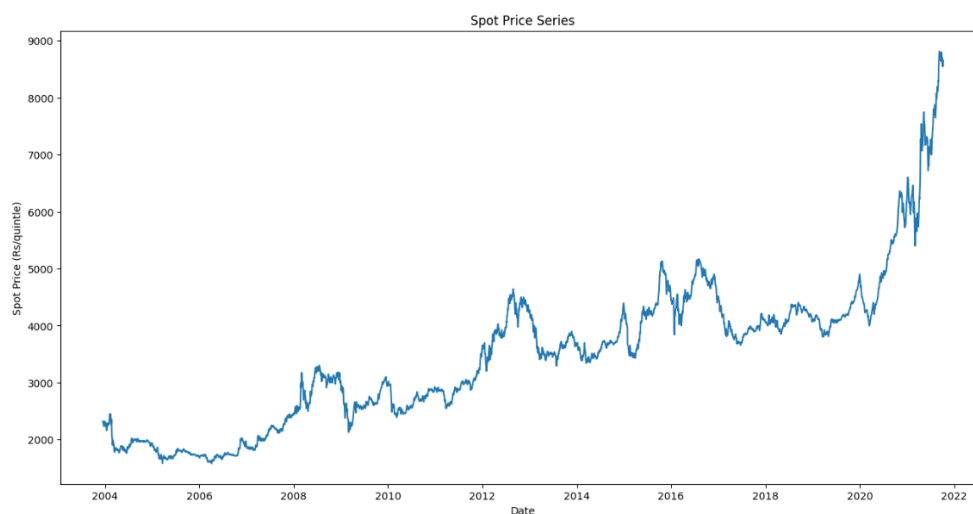


Fig 2.2 Trend in spot prices of mustard seed: 2003 to 2022

Note: Price series are in the form of 7-day moving average for reasons as explained earlier.

Source: Authors' analysis based on polled spot prices provided by NCDEX.

The relationship between ⁹traded volume (RMSEED) and spot prices of mustard seed is plotted in Fig 2.3.¹⁰ It is evident that over the past 20 years, there has been a trend in rise in nominal prices of mustard seed, with several phases of downswing as well. However, since 2020, the surge in RM seeds spot prices has been unprecedented. Undoubtedly, the decision to suspend mustard seed ETCDs could have been triggered by these trends, but it needs to be understood that the underlying factors were not necessarily linked to RMSEED futures trading.

Mustard seed however registered a steady fall post suspension, which may be attributed increased supply owing to two years of high production.¹¹ Mustard prices started to decline from May 2022 along with that of all other edible oils. **An important point that we highlight all through our analysis is that the volumes of futures trading is significantly small compared to total production and arrivals in the primary markets to the extent that for them to influence retail prices, extraordinary levels of market manipulation would have to be orchestrated of which there has been no evidence from any documented source over the decades of existence of agricultural commodity futures trading.**

Table 2.1 reports the results of the Granger causality test for the two variables for RM seed. Granger causality of change in traded volume to spot price change have been tested based on standard procedures.

⁹ The significance of mustard in the food consumption basket of not only Indian households but also globally can be gleaned from the fact that following soybean oil and palm oil, mustard seed is the most important source of edible oil globally. It is also one of the most important sources of protein meal, the leading source being soybean meal. Grown as a rabi crop in India, its production and hence marketing season differs from that of several other sources of edible oil.

¹⁰ Throughout our analysis, spot prices have been plotted till suspension date only while retail prices have been plotted around the suspension date.

¹¹ Discussions with experts suggests that RMSEED for the arrival season were early trading at backwardation (spot prices were higher than futures prices)

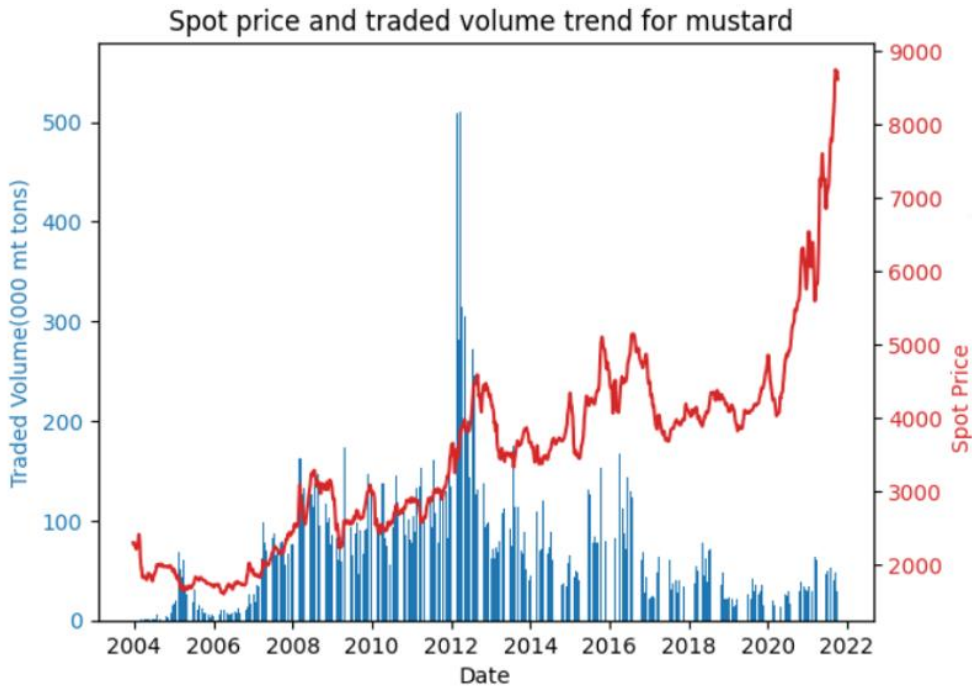


Fig 2.3 Spot prices and traded volume for mustard seed: 2004 to 2022

Source: Authors' analysis based on polled prices and traded volume data provided by NCDEX.

Note: The primary Y-axis is traded volume of RMSEED whereas secondary Y-axis is spot price of mustard seed (Rs per quintal). While we have a longer series for mustard seed spot prices, futures trading (RMSEED) commenced later.

Table 2.1 Granger causality between mustard seed futures volume and spot prices

Granger Causality	Lag order*	p-value
Traded volume change does not Granger cause spot price change	1	0.740
Traded volume change does not Granger cause spot price change	2	0.130
Traded volume change does not Granger cause spot price change	3	.020

Notes:

1. Granger causality test to determine whether past movements in one variable can help explain current movements in another one; if so, the latter variable is said to be caused by the former one.
2. For all causality tests in this paper, optimal lag order for causality test is 1, so judgements for results should be based on values with lag order 1. Optimal lag has been determined by the principle of parsimony.
3. For all commodities, spot price, futures price, trading volume series are I(1), so causality has been tested between the first difference series of variables.

(These notes are applied to all the causality tests in this chapter.)

As is evident from Table 2.1, we do not find changes in traded volume of RMSEED to Granger cause the changes in spot price for mustard seed. **This result suggests that in the case of mustard seed, futures trading activity does not destabilize the spot prices.**

The relationship between the spot and futures price for mustard seed as shown in Fig 2.4 indicates that both price series are moving together over the time. It is consistent with the financial theory of the commodity derivative market that futures and spot prices are interlinked and as the futures contract approaches expiration, the interest rate differential has less effect on the futures price, and the futures price converges to the spot value. One thing can be noticed again that prices were stable till 2019 but spot and futures prices both picked up from starting months of 2020 with the outbreak of COVID-19 and it soared up since then as COVID-19 spread and became grave while we can notice in Fig 2.3 that traded volume of ETCD of mustard in this period stayed low.



Fig 2.4 Spot and futures prices for mustard seed: 2004 to 2022

Note: Prices are in Rs per quintal

Next, we would check the Granger causality from futures prices to spot prices and reverse too. Additionally, we would also see if both series are cointegrated.

Table 2.2: Granger causality between mustard seed futures price and spot prices

Granger Causality	Lag Order	P-Value
Change in futures prices Granger causes change in spot prices	1	0.000
Change in futures prices Granger causes change in spot prices	2	0.000
Change in futures prices Granger causes change in spot prices	3	0.000

for RMSEED spot prices change Granger cause futures prices change as well. We do not provide a separate table for that as both results are similar. The values can be provided upon request. The Granger causality tests suggest that in the case of mustard, futures prices Granger cause spot prices but futures market liquidity levels do not Granger cause spot prices.

This provides evidence of price leadership of the futures contracts where price signals can be used to design better hedging strategies without destabilization of the spot price as increased liquidity is not causing spot prices. Futures markets are expected to respond to new information faster than spot prices, thereby enabling price discovery. We also found both series to be cointegrated, which is crucial for price discovery.

2.3.2 Soybean

In the same way as for mustard, we analyzed the soybean trading volume, spot price and future price series. Soybean futures witnessed the suspension for the first time on 20th December 2021.

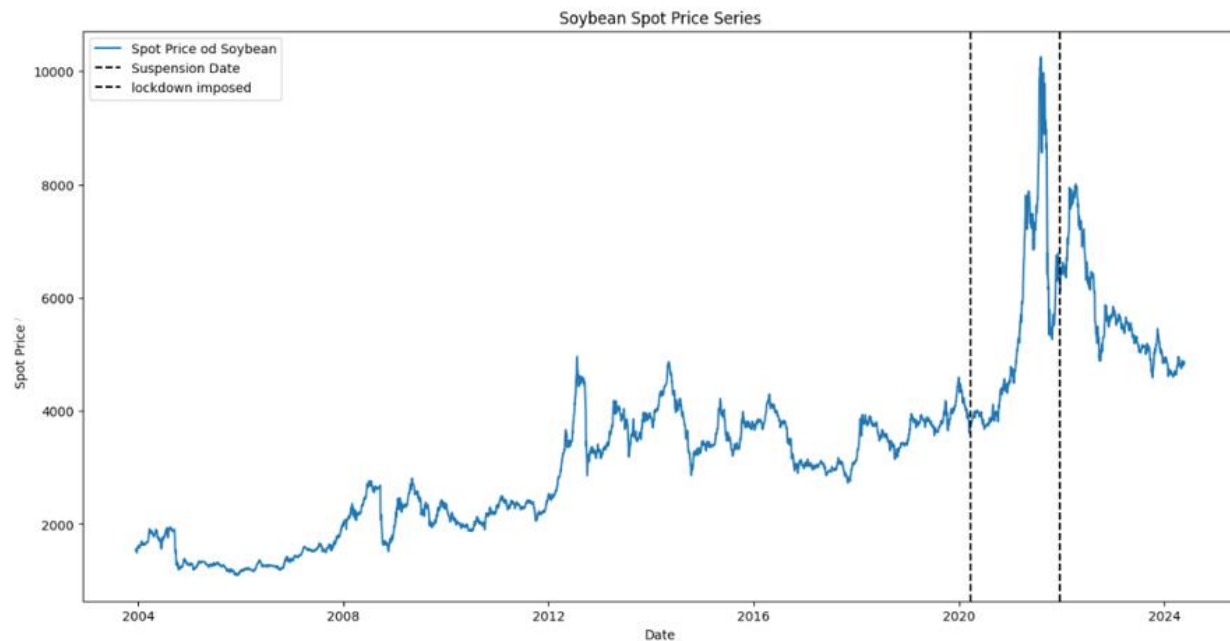


Fig 2.5 Trend in spot price of soybean: 2004 to 2024

Note: Spot prices are in Rs per quintal.

Vertical dashed line on the left refers to suspension and on the one on the right refers to imposition of nationwide lockdown.

It is evident from the spot price series in Fig 2.5 that soybean prices were trending gradually until 2019 but started to rise sharply before the suspension was in force i.e. from August 2020 (first dashed vertical line) and the prices remained high. Interestingly, before the suspension in 2021 (second dashed vertical line) prices had fallen sharply, to the extent that in several markets, farmers received lower than MSP. However, after the suspension, price surged for a few months. Prices stayed firm even after four months on an account of peak in demand and supply shocks associated with lower domestic stocks and international factors including geo-political factors such as the Russia-Ukraine war that started in February 2022. From the demand side, high edible oil sentiments in domestic and international markets kept soybean prices upbeat till June 2022. Since

mid-2022, soybean prices continued to fall. Such trends are attributable to fundamental factors such as favorable global stocks position particular in the US and high domestic stock of edible oil on account of high imports that resulted in a negative crush margin. Among other international factors, soybean market sentiments continued to be corrected by conducive weather in Brazil and Argentina. From a domestic market perspective, there was a correction in soybean prices due to a favourable onset of the monsoon in major soybean producing states like MP, Maharashtra and Rajasthan.

Soybean prices remained subdued due to higher arrivals in May 2023 during the October 2022-September 2023 marketing season and favorable production in the kharif 2023 season. Although not represented here, at the time of writing, soybean prices continue to fall not just in India but globally in the October 2023-September 2024 marketing season. It should be noted that the Indian soybean supply is minuscule in comparison to the global supply, and mainly responds to local domestic supply and global price trends. We have undertaken detailed analysis of the fundamentals that are corroborated by insights from stakeholder interactions as reported in Chapter 3. Next, we show the spot price and trading volume relationship for soybean.

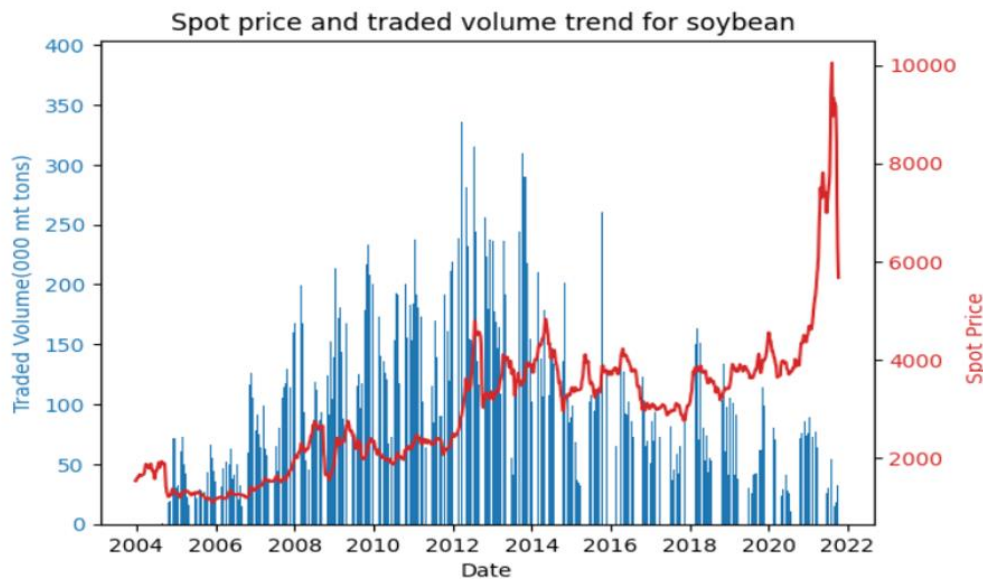


Fig 2.6 Spot prices and traded volume for soybean: 2004 to 2022

Note: Spot prices are in Rs per quintal.

mt tons refers to metric tonne.

Table 2.3 Granger causality between soybean traded volume and spot prices

Granger Causality	Lag Order	P-Value
Traded volume change does not Granger cause spot price change	1	0.09
Traded volume change does not Granger cause spot price change	2	0.26
Traded volume change does not Granger cause spot price change	3	0.40

It is evident from the table that in the case of soybean, traded volume change does not Granger cause spot price changes for soybean. The relationship between soybean spot and futures price series are presented in Fig 2.7.

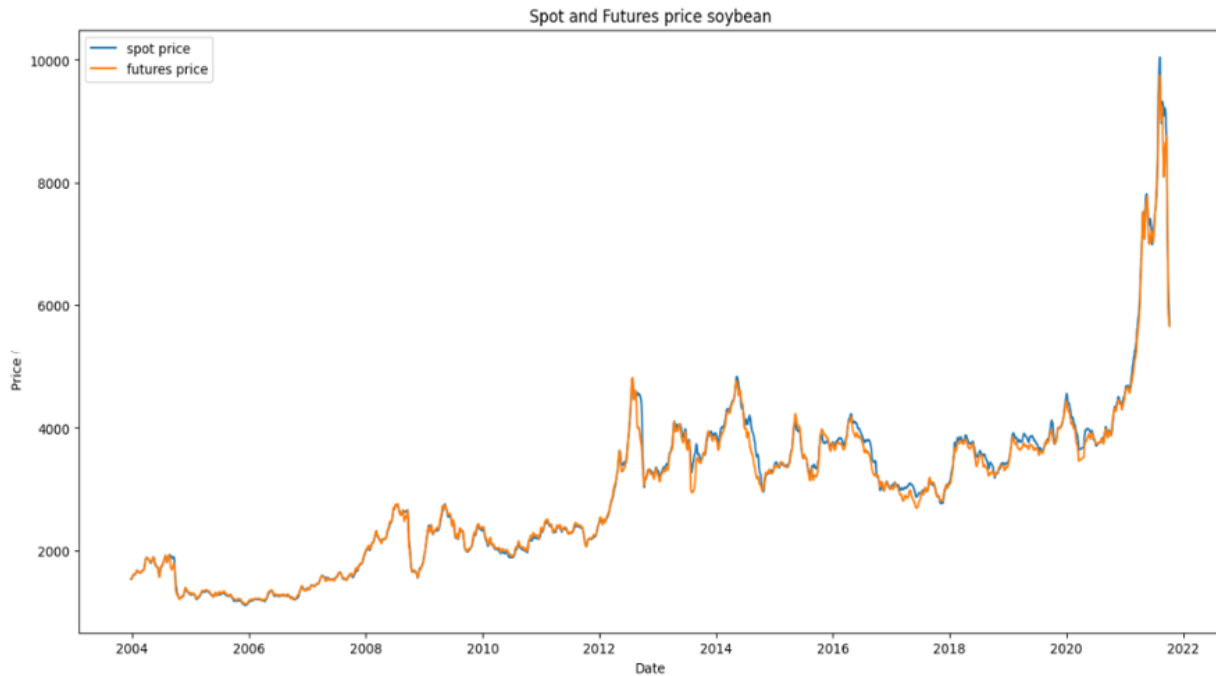


Fig 2.7 Spot and future price of soybean: 2004 to 2022

Here again, similar to the case of mustard seed, both series are moving together in the long run. Table 2.4 shows results of Granger causality tests for causality running from future prices to spot prices. Results for reverse causality are the same in nature, so we have not presented a table for that to save space.

Table 2.4 Granger causality between soybean futures price and spot prices

Granger Causality	Lag Order	P-Value
Change in futures prices Granger cause change in spot prices	1	0.000
Change in futures prices Granger cause change in spot prices	2	0.000
Change in futures prices Granger cause change in spot prices	3	0.000

Spot price series and futures price series are I(1). We found that both series are cointegrated for soybean.

2.3.3 Refined Soy Oil

Trading of refined soy oil futures on NCDEX was suspended twice since its introduction on the exchange. The Government of India suspended chana and refined soy oil futures trading in May 2008 to bring down the soaring prices of both commodities. The second suspension of refined soy oil was in December 2021. As we examine if ETCO suspension affected retail prices of soy oil only or whether the trend was uniform for all the edible oils, we begin by comparing the retail prices of refined soy oil and that of its peer edible oils: palm oil, groundnut oil, soy oil, and sunflower oil (Fig 2.8) and spot prices of soy oil (Fig 2.9).

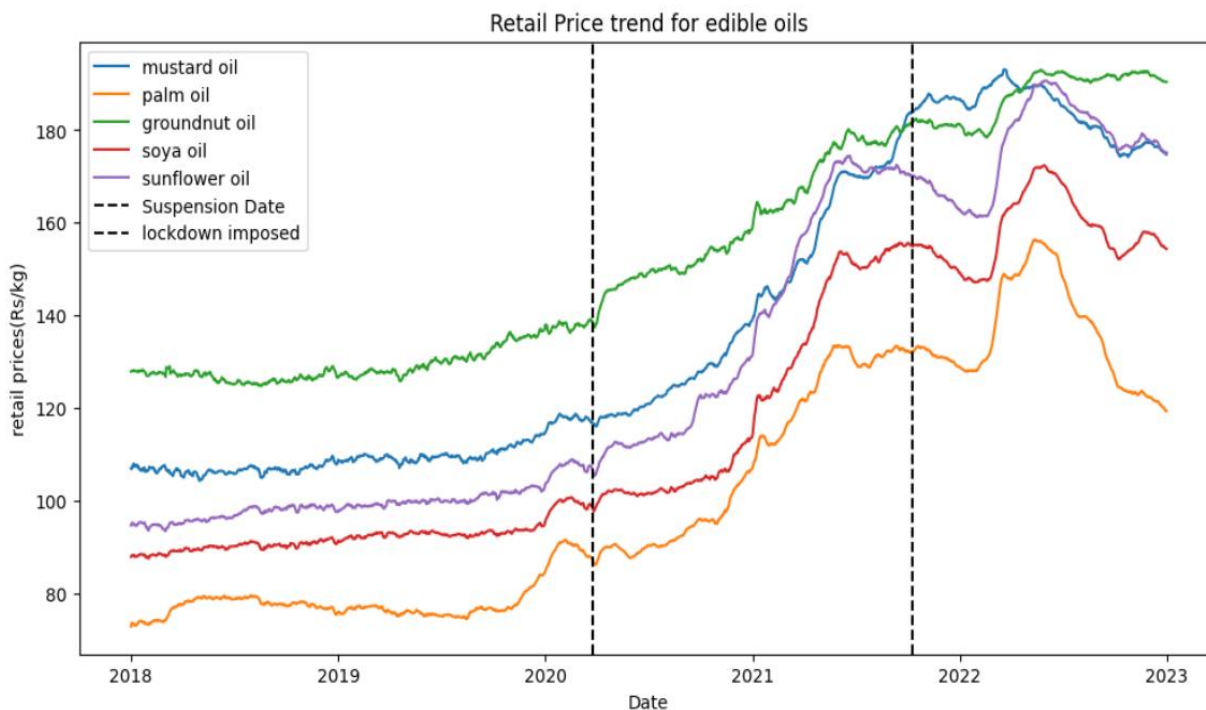


Fig 2.8 Retail prices of edible oils around the suspension date

Note: Vertical dashed line on the left refers to suspension and on the one on the right refers to imposition of nationwide lockdown.

Suspension of soy oil ETCED did not help to curb the retail prices. As discussed earlier, it can be noticed that from February 2022, prices of all edible oils began to rise sharply and this is largely attributed to the Russia-Ukraine war that broke out on February 20, 2022. A month prior, in January 2022, the largest palm oil (CPO) producer in Indonesia mandated palm oil exporters to sell 20% of their total exports at lower prices in the domestic market in order to control domestic prices, and went on to ban CPO export. Around the same time, the second larger producer of CPO, Malaysia started reporting lower stock of CPO amid labour market related shortage which led to bullish sentiment in both CPO and soya oil globally. Since, India has huge dependence on edible oil exports, there was a considerable spike in domestic retail prices as observed.

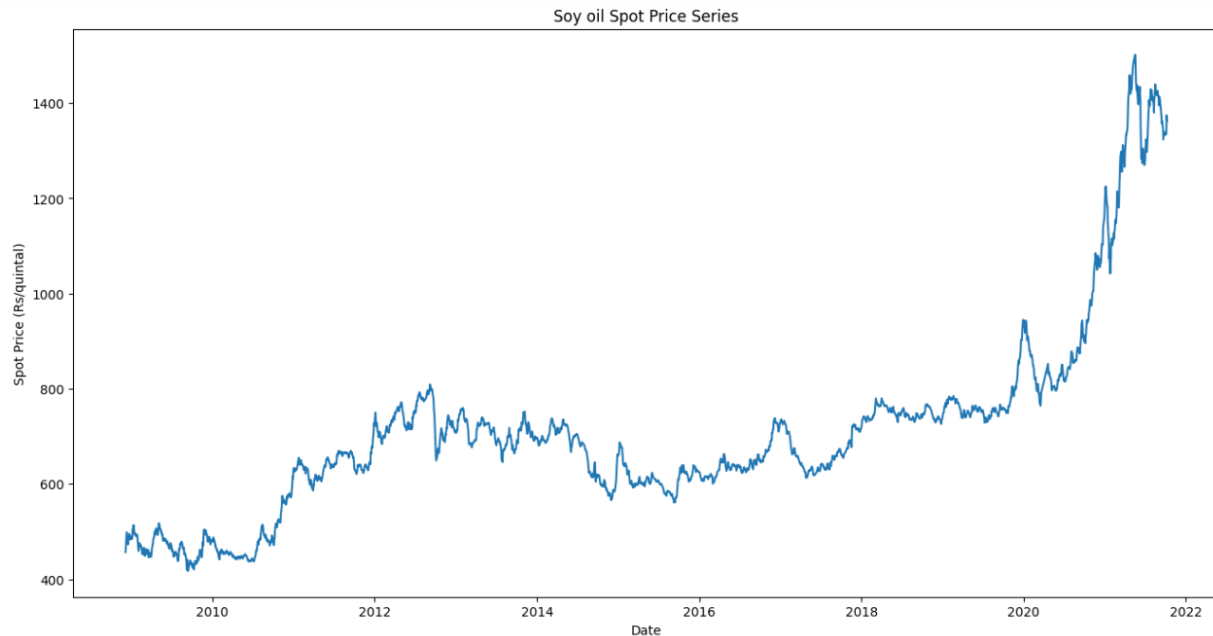


Fig 2.9 Spot price of soy oil: 2008 to 2022

Data on spot prices and traded volume for soy oil have been taken since its relaunch after 2008 suspension. Soy oil prices rose unprecedentedly from March 2020 but declined in the 2023-24 season for reasons described earlier. India allowing import of 2 million tonnes of soy oil and sunflower oil (a substitute) for next two years (2022-23 and 2023-24) at nil rate of custom duty. CPO prices in the international market had also corrected considerably by that time. These fundamental suggest that the spot prices had a downward trend owing to increased domestic supply which in turn was a result of changing domestic and international trade policies.

While exploring the spot price and future trade volume series, we notice that in recent years, price rise is accompanied with relatively lower than past traded volume in futures contracts.

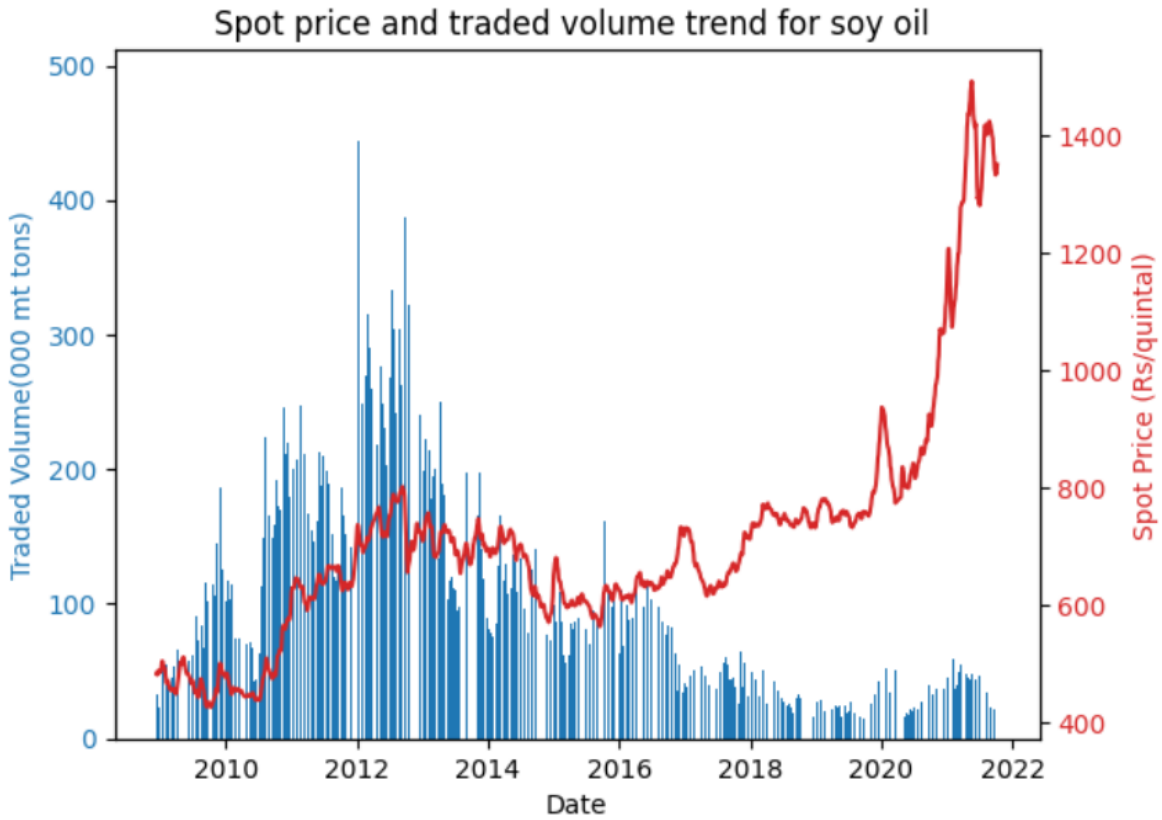


Fig 2.10 Spot price and trading volume for refined soy oil: 2008 to 2022

Note: mt tons in traded volume denotes metric tonne.

Table 2.5 indicates that traded volume change Granger causes spot price change in case of soy oil but at a lag order of 3.

Trade 2.5 Granger causality between refined soy oil traded volume and spot prices

Granger Causality	Lag Order	P-Value
Traded volume change does not Granger cause spot price change	1	0.130
Traded volume change does not Granger cause spot price change	2	0.100
Traded volume change does not Granger cause spot price Change	3	0.040

Note: As mentioned in notes on Table 2.1, optimal lag order is 1. Therefore, we should base the judgment on values of lag order 1.

To explore spot and futures price relationship for soy oil, we assess the Granger causality from both directions and check if both series are cointegrated.



Fig 2.11 Spot and futures Price of Soy oil: 2009 to 2022

Note: Prices are in Rs per quintal.

Here too, spot and future prices are closely moving together throughout the period of time, and our cointegration test confirms the same (Fig 2.11).

Table 2.6 Granger Causality between refined soy oil futures price and spot price

Granger Causality	Lag Order	P-value
Change in futures prices Granger causes change in spot prices	1	0.000
Change in futures prices Granger causes change in spot prices	2	0.000
Change in futures prices	3	0.000

Granger causes change in spot prices		
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It is evident from Table 2.6 that in the case of refined soy oil, spot price change Granger causes futures price change and vice versa. Both the series are found to be cointegrated as in the case of the other commodities, suggesting a strong case for importance of price discovery that the refined soy oil ETCDs before suspension.

2.3.4 Chana

Chana or chickpea futures contract was introduced in the NCDEX platform in April 2004. Chana is a significant pulse in India, contributing to over half of the entire pulse production in the country. Chana futures contract witnessed three instances of suspension. In the year of global financial crises, in response to rising chana prices, the central government suspended futures trading on chana. However, this suspension was lifted in December of the same year. Second, suspension on chana was imposed in June 2016, this suspension lasted till July 2017 whereas the third suspension came into force in August 2021.

As we focus on the recent suspension episodes, and chana witnessed suspension in 2016 and 2021, we conducted separate analysis for both suspension events. For the 2016 suspension event, we took the data from December 2008 to June 2016 whereas for the 2021 suspension event, we took data from July 2017 to December 2021. We test if suspension impacted prices of chana or other factors affected the prices. To test the same, we argue that If prices of all pulses show a similar trend, it means some other factors are guiding prices of pulses and if only chana has a shift in trend post suspension, it suggests suspension has worked. To test if there was any significant change in trend of chana retail prices in response to the ETCD suspension, we have clubbed it with other pulses to determine if there was a break in trend only chana or it was uniform across all pulses under consideration.

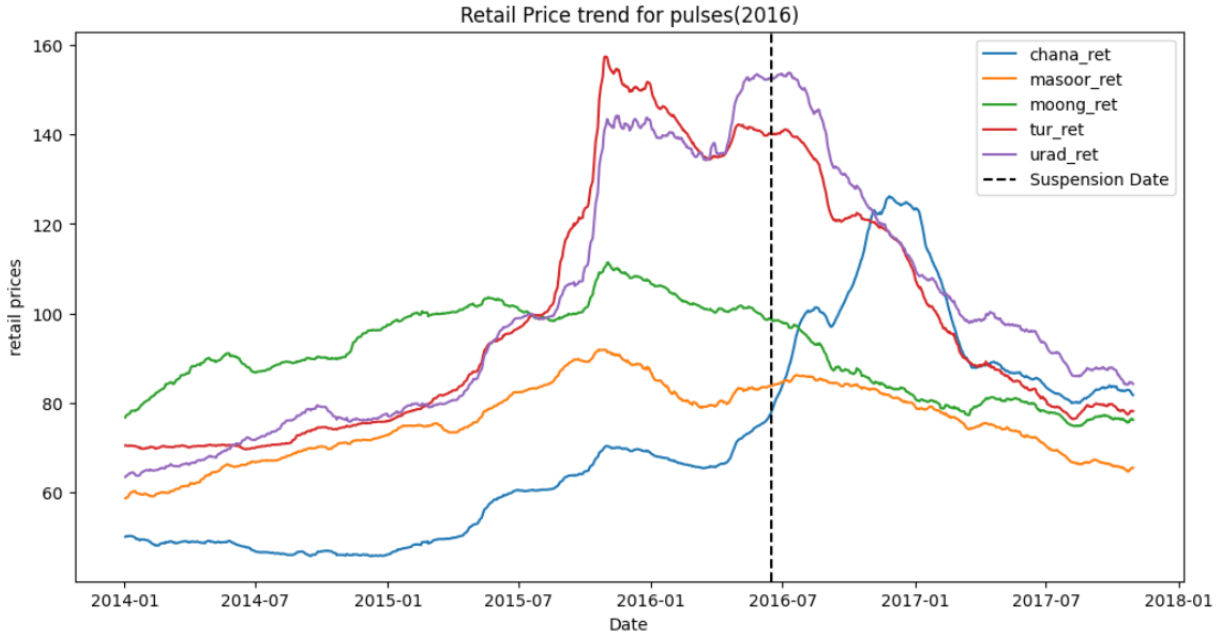


Fig 2.12 Retail price trend for pulses around suspension of June 2016: 2014 to 2018

Note: In the legend, subscript ‘ret’ refers to retail prices

From Fig 2.12, it can be noticed that after the suspension chana kept on rising for next six months and began declining from December 2016. This reflects that price rise was largely linked to the fundamental factors of supply and demand and suspension of futures trade did not result in arresting the price rise. Thus, factors other than futures trading are rather important in determining the market sentiments and price direction.

It is noticeable that other pulses were having a downward trend but chana had an upward trend; in a direction opposite to other pulses until December 2016. However, it is also worth noting that other pulses already had a run-up in price much before chana prices commenced to witness upward trend. Moreover, if the suspension of derivatives trading in chana had the potential to bring down soaring prices, chana prices should have declined in response to suspension, but it did not happen. It should be noted that for several years, Chana spot prices remained considerably higher than the MSP. In 2020, both chana and moong had a hike in the MSP, by 6.3% and 4.3% respectively. Around the same time, mustard spot prices were nearly 20% higher than MSP.



Fig 2.13 Retail price for pulses around suspension in August 2021: 2019 to 2023

Note: In the legend, subscript 'ret' refers to retail prices

Vertical dashed line on the left refers to suspension and on the one on the right refers to imposition of nationwide lockdown.

It is evident from Fig 2.13 that the price of all pulses of interest picked up with the imposition of lockdown due to COVID-19 pandemic and kept on rising further. Here chana prices stabilized after suspension while its price level remained higher than the pre-lockdown period. Over the same period, other pulses have also shown stable prices. The reasons for stabilization of chana prices after suspension while other pulses continued to register an uptick is largely on account of the fundamentals of chana. In terms of behavior of the spot prices of chana, Fig 2.13a plots the spot price for the period December 2008 to 2017 and Fig 2.13b plots the spot price from July 2017 to December 2021.

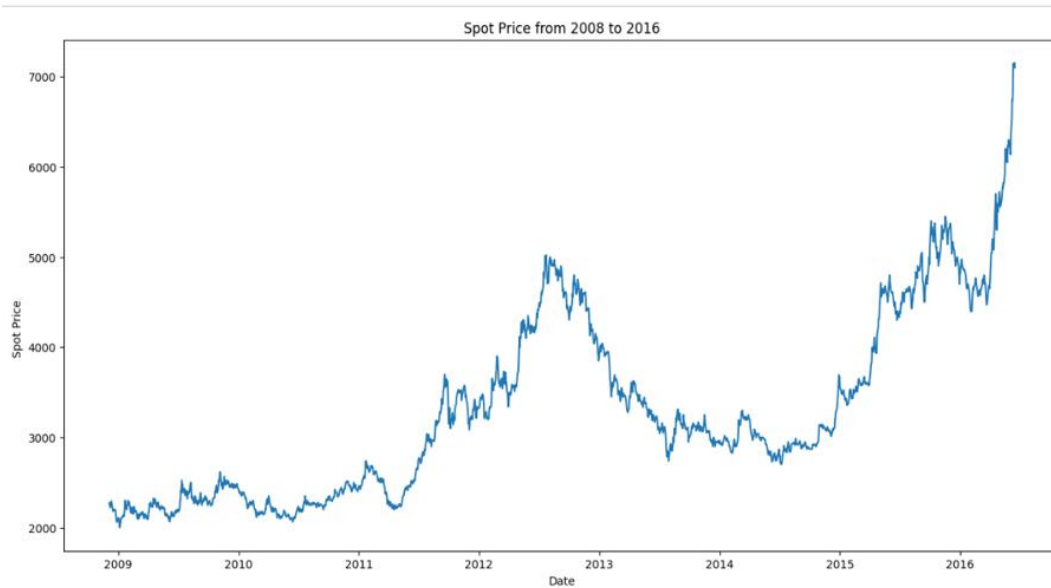


Fig 2.13a Spot price of chana: 2008 to 2016

Note: Prices are in Rs per quintal.

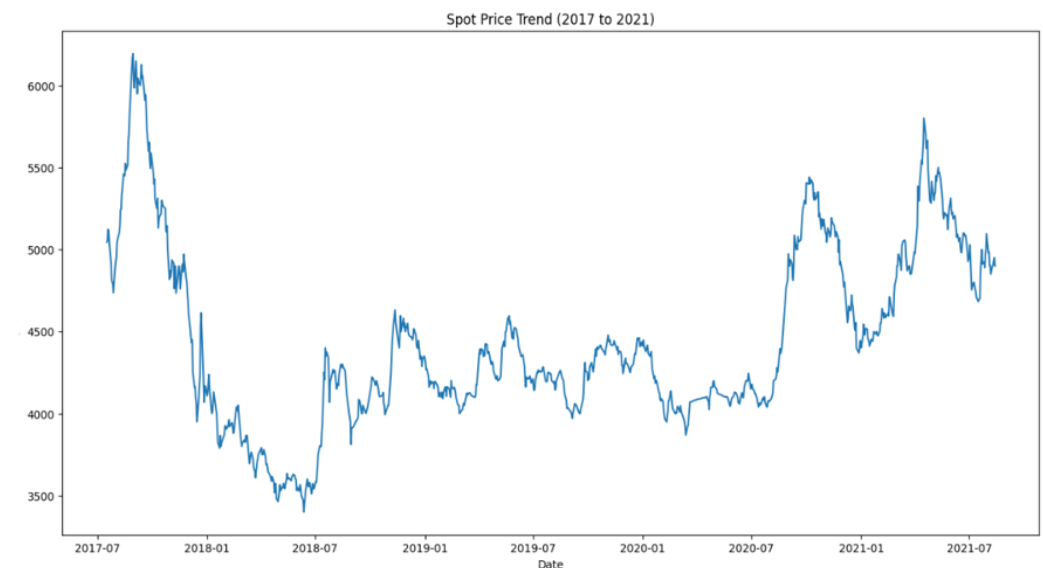


Fig 2.13b Spot price of chana: 2017 to 2021

Note: Y axis represents Spot price (Rs/Quintal).

Lag order 1 is optimal lag, so judgment should be based on lag order 1 only.

Chana prices traded higher during peak festival demand in fall 2021, however there was a gradual correction. It may be noted that chana and mustard seed production was at record levels for two consecutive seasons (marketing year 2022-23 and 2023-24 respectively) which resulted in fall in prices. Given the cross-price elasticity between chana and its substitute pulses, free import policy for other pulses like tur, urad and moong subdued chana prices.

Next to explore the relationship between spot prices of chana and traded volume of chana futures contract for both periods.

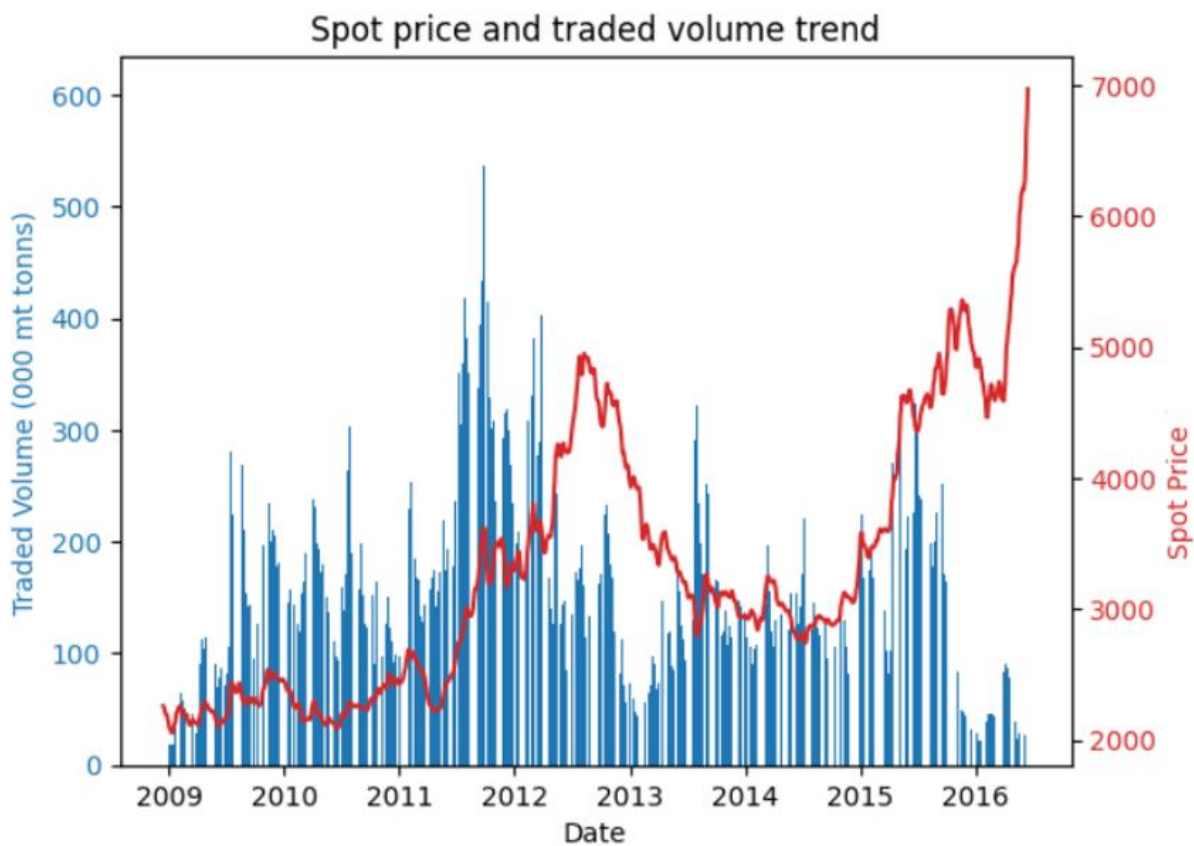


Fig 2.14a Spot price and traded volume for chana: 2008 to 2016

As seen from Fig 2.14 (a), it does not seem that trading volume of chana futures and spot prices of chana co-moved during 2008 to 2016. In contrast, Fig 2.14 (b) suggests that chana spot prices and trading volume are moving together over the pre-suspension period.

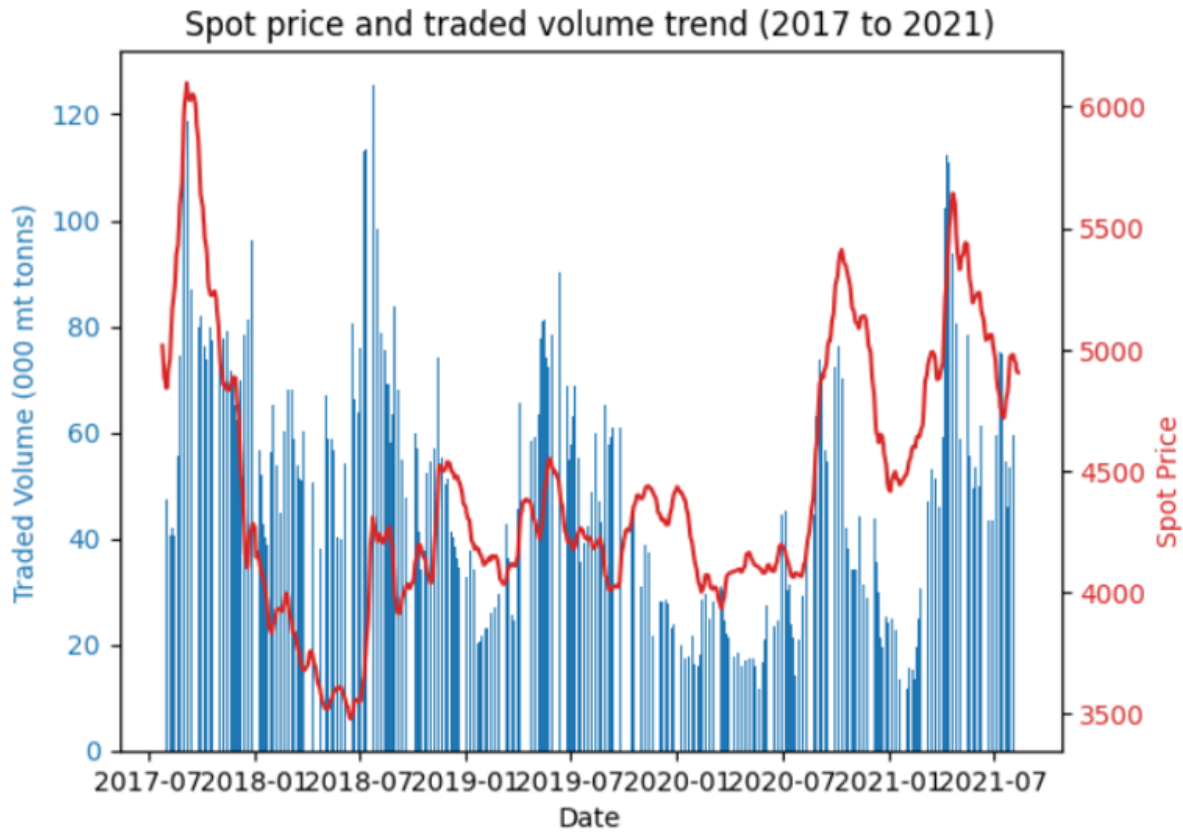


Fig 2.14b Spot price and traded volume for chana: 2017 to 2021

Tables 2.7a-2.7b show the results for Granger causality tests from traded volume change to spot prices change for chana, for both periods.

Table 2.7a Granger causality test for chana traded volume and spot price for period 1 (2008 to 2016)

Granger Causality	Lag Order	P-value
Traded volume change does not Granger cause spot price change	1	0.530
Traded volume change does not Granger cause spot price change	2	0.010
Traded volume change does not Granger cause spot price change	3	0.002

Note: Lag order 1 is optimal lag, so judgment should be based on lag order 1 only.

Table 2.7b Granger causality test for chana trade volume and spot price for period 2 (2017 to 2021)

Granger Causality	Lag Order	P-value
Traded volume change does not Granger causes spot price change	1	0.01
Traded vol change does not Granger cause spot price change	2	0.05
Traded volume change does not Granger cause spot price change	3	0.06

Note: Lag order 1 is optimal lag, so judgment should be based on lag order 1 only.

Test results suggest that for the period before June 2016 suspension, traded volume change does not Granger cause spot price change for chana while for the period prior to the December 2021 suspension, traded vol change Granger causes spot price change. Again, causal effects from both directions and cointegration between both series have been tested for both periods. For both the periods, spot and futures prices Granger cause each other and both series are cointegrated for both periods.

Table 2.8 Granger causality test between chana futures and spot prices

Granger Causality	Lag Order	P-Value
Change in futures prices does not Granger causes change in spot prices	1	0.000
Change in futures prices does no Granger causes change in spot prices	2	0.000
Change in futures prices does not Granger causes change in spot prices	3	0.000

Note: Lag order 1 is optimal lag, so judgment should be based on lag order 1 only.

At the time of writing, the central government has imposed a stock limit for chana and tur (pigeon pea) till September aiming to prevent speculative hoarding. This suggests that not only suspension of ETCs (which was argued by the regulator to be inflationary) but also other measures undertaken by the government are yet to curb the rising pulse prices.

2.3.5 Wheat

Since its introduction in NCDEX, wheat ETC has been suspended twice. The first suspension was imposed in February 2007 and the second instance of suspension is a recent one in December 2021. One noticeable feature of wheat futures contract trading is that trading remained extremely weak since November 2019 to the suspension date. It is clear from Fig 2.15 that suspension of wheat futures could not cool down retail prices of wheat as it remained high even after suspension following a short period of decline in prices around the end of 2022. In February 2023, there was a spike in wheat prices that lasted for a few months following which the prices declined again only to rise later.

Given the importance of grains such as wheat in the public distribution system (PDS) and active government procurement for price stabilization, these trends in retail price of wheat warrants attention. Fig 2.16 plots the spot prices of wheat from 2009 to 2022. The structural break in the spot prices since 2013 is likely due to the implementation of National Food Security Act (NFSA). It is not surprising to see that despite being the world's second largest producer of wheat, food inflation including wheat prices is a recurring issue. In addition, a 44% import duty on wheat (imposed in 2018) does not help ease the prices especially when global wheat prices are lower. Among other interactional factors, geopolitical factors like the Russia-Ukraine War contributed to spike in prices since the first quarter of 2022. Coupled with higher export demand, there was a large surge in wheat exports from India in the summer of 2022, which was followed by an export restriction on wheat exports.

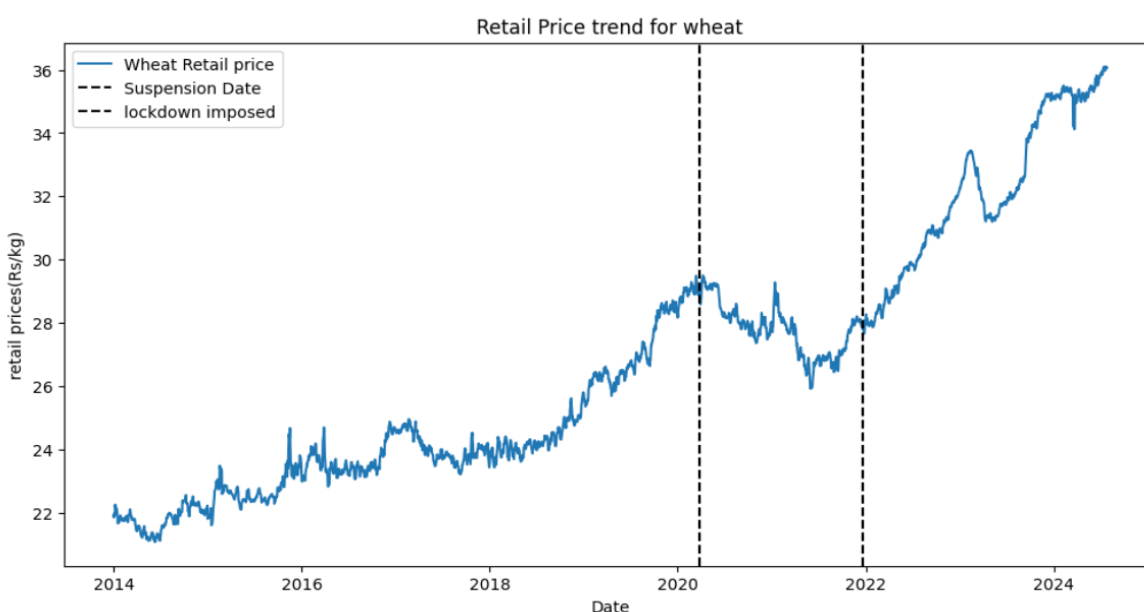


Fig 2.15 Retail price trend of wheat for period 2018 to 2023

Note: Vertical dashed line on the left refers to suspension and on the one on the right refers to imposition of nationwide lockdown.

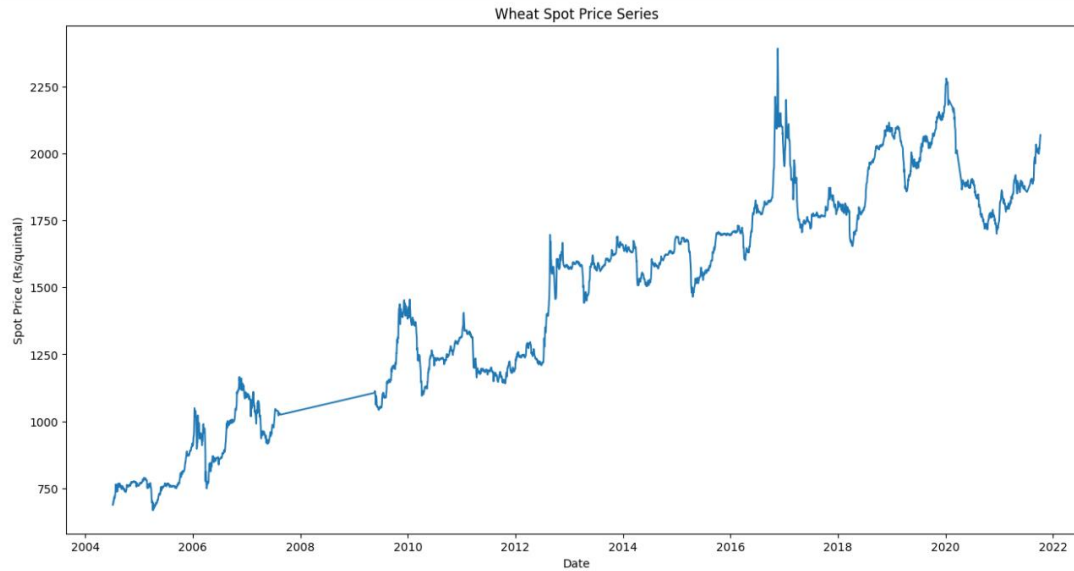


Fig 2.16 Spot price trend of wheat: 2009 to 2022

In terms of the effect of traded volume on spot prices for wheat, Fig 2.17 indicates that trading in wheat has been relatively weak since its re-introduction in the exchange but a couple years before suspension in 2021, it had extremely weak trading.

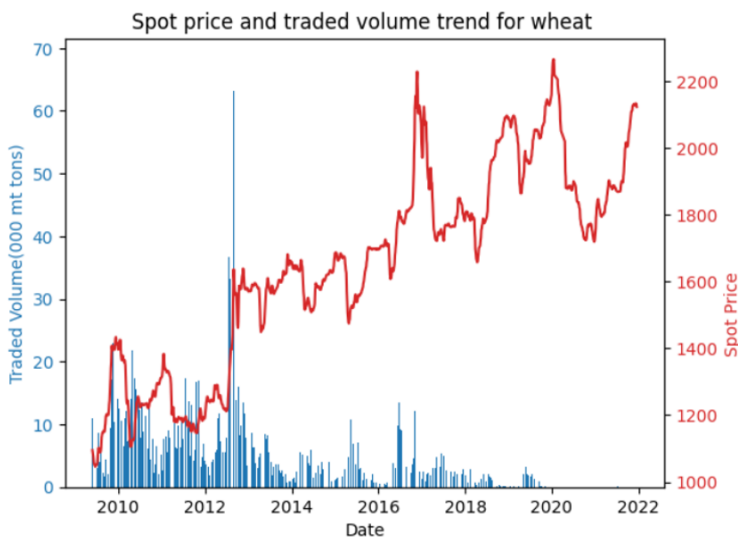


Fig 2.17 Spot price and trade volume for wheat: 2010-2022

Note: Spot prices are in Rs per quintal. 'mt tons' denotes metric tonnes.

Table 2.9 Granger causality test between wheat traded volume and spot prices

Granger Causality	Lag Order	P-value
Traded Vol change granger causes spot price change	1	0.020
Traded Vol change granger causes spot price change	2	0.007
Traded Vol change granger causes spot price change	3	0.004

Interestingly, the causal effect running from traded volume to spot prices for wheat is different from other commodities. **Of all the commodities analyzed in our study, only the traded volume change of wheat Granger causes wheat spot prices.**



Fig 2.17 Spot and futures price of wheat: 2009 to 2022

Note: Prices are represented on the Y-axis, with unit as Rs per quintal.

Next, we present the results on the relationship between spot and futures price for wheat (Fig 2.17). It is evident that both the spot and futures price series have moved together over time, with the spot prices of wheat generally higher than futures prices between 2017 and 2018.¹² Since April 2016, domestic prices of wheat have been higher than that of international prices. Between 2016 and 2017 there was also a significant increase in MSP compared to between 2015 and 2016. In June 2017, there was an upward pressure on international food prices due to higher prices for wheat. The price rise was due to drought in the US and Canada where the spring wheat crop was significantly damaged. During this period, the CBOT-traded winter wheat futures also registered a decline.

Table 2.10 Granger causality test between wheat futures and spot prices

Granger Causality	Lag Order	P-Value
Change in futures prices does not Granger cause change in spot prices	1	0.000
Change in futures prices does not Granger cause change in spot prices	2	0.000
Change in futures prices does not Granger cause change in spot prices	3	0.000

We find a bidirectional relationship between wheat spot and futures prices. Both series cointegrated in the long term.

¹² The difference between futures prices and spot prices can be explained using the price of carrying physical grain and storage rate. Typically, in the US futures market, contracts expire with a higher percentage above the cash (spot) price. See for example, Garcia *et al.* (2015) who analyze the relationship between spot and futures prices for corn, wheat and soybean, and find that futures contracts expired up to 35% above the cash price from 2005 to 2010.

2.3.6 Volatility

As concerns have been raised that futures market trading is causing excessive volatility in prices of underlying commodities. It means that in absence of ETCD, volatility of prices of commodities should go down. Table below shows the comparison of volatility before and after suspension of ETCD. We have presented the volatility comparison for all suspended commodities including mustard. Volatility of one month before and after suspension, two months before and after suspension have been compared. Rationale for one month volatility comparison is to observe immediate effects of suspension on volatility, while two months comparison has been taken to capture spillover effects of intervention and allow for mean reversion of series. Standard deviation has been taken as a volatility measure as described earlier. Tables 2.11a-2.11d show commodity-wise ‘volatility in spot prices one/two month before/after suspension’ and ‘volatility in retail prices one/two month before/after suspension’.¹³

Table 2.11 Commodity-wise volatility for periods before and after suspension

(a) Mustard seed

Period	Before Suspension	After Suspension
Spot (one month)	0.006	0.013
Spot (two month)	0.010	0.013
Retail (one month)	0.006	0.007
Retail (two month)	0.006	0.008

¹³ Retail prices were not available for soybean but for soybean oil. Therefore, the soybean analysis relies only on spot prices.

(b) Chana

Period	Before Suspension	After Suspension
Spot (one month)	0.015	0.022
Spot (two month)	0.015	0.018
Retail (one month)	0.010	0.007

(c) Refined Soy oil

Period	Before Suspension	After Suspension
Spot (one month)	0.008	0.005
Spot (two month)	0.007	0.007
Retail (one month)	0.005	0.006
Retail (two month)	0.005	0.005

(d) Wheat

Period	Before Suspension	After Suspension
Spot (one month)	0.005	0.009
Spot (two month)	0.005	0.008
Retail (one month)	0.034	0.028
Retail (two month)	0.030	0.023

If the suspension has positively impacted the volatility, then we would expect lower volatility in the post-suspension period for the commodity prices. **It is evident from above tables that suspension of ETCD has clearly not resulted in reduction of volatility of spot and retail prices of commodities in general. Wheat was however not actively traded in the futures market and it should not be considered that suspension has a positive impact in form of lower volatility.**

2.3.7 Comparison of volatility of suspended commodities with its domestic peers (unsuspended commodities) and international peers

If the suspension addressed high volatility of the commodities whose trading was suspended, then we would expect lower volatility in the post-suspension period for the commodity spot prices. However, it is possible that the decline in the volatility is merely reflective of the decline in the volatility of commodities in general and not of the commodity whose futures trading was suspended. Therefore, we compare the possible volatility change of the suspended commodities with a group of unsuspended agriculture commodities that are more or less of the same group of commodities.

In order to understand the relative change in volatility of spot prices of suspended commodities in response to suspension, we compare the volatility in daily returns of suspended commodities with its domestic peers and international peers. Table below describes the domestic and international peers taken for each commodity.¹⁴

Table 2.12 Suspended commodities and their domestic and international peers

¹⁴ Data for international peers and domestic peers are provided by NCDEX. Spot prices on domestic commodities are polled prices collected by NCDEX except washed cotton seed oil that is taken from Cogencis (SEA of India).

Commodity	Domestic Peer	International Peer
Mustard	Groundnut Oil	International Canola
Soy Oil	Groundnut Oil	International Soy Oil
Wheat	Basmati (Paddy)	International Wheat
Chana	Tur and Masoor	None

We assess the three months pre-suspension and post-suspension volatility as well as six-month pre-suspension and post-suspension volatility of each commodity and plot the volatility of suspended commodities with their domestic and international peers. As is standard in the literature, we measure volatility by standard deviation and for each day, rolling standard deviation of the past 22 days (equivalent to one month) have been calculated.

We attempt to compare the peers: those commodities which were not suspended and match the category of the suspended commodities. Chana volatility can be compared with that of Tur, Urad, Masoor though none of them were available for trading in 2021 (when latest suspension was imposed). Fig 2.18a-2.21a show volatility comparison with peers for three months around suspension (pre and post) for mustard, soy oil, wheat, and chana respectively while Fig 2.18b-2.21b show volatility comparison for six months around the suspension date for the same commodities, respectively.

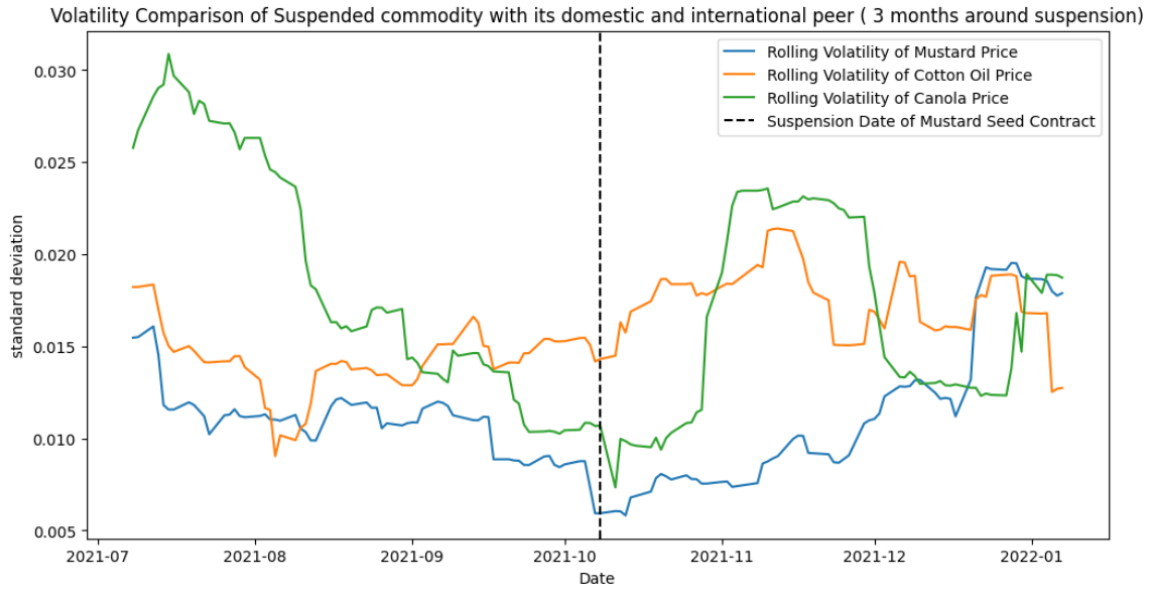


Fig 2.18a Mustard, 3 months around suspension

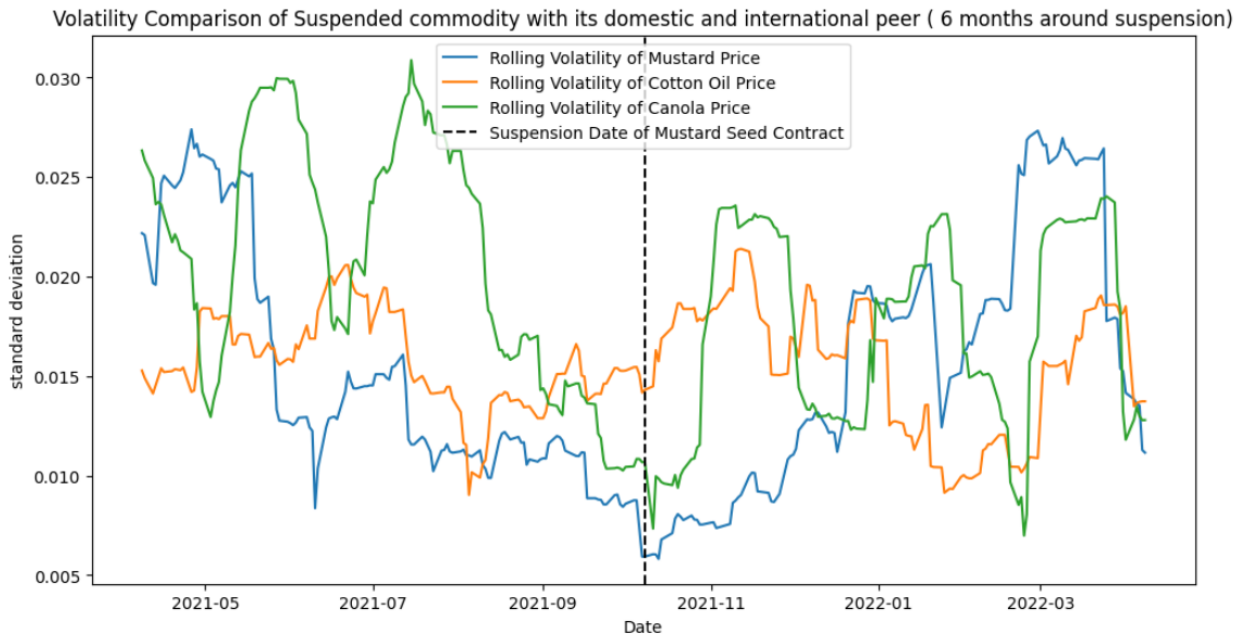


Fig 2.18b Mustard, 6 months around suspension

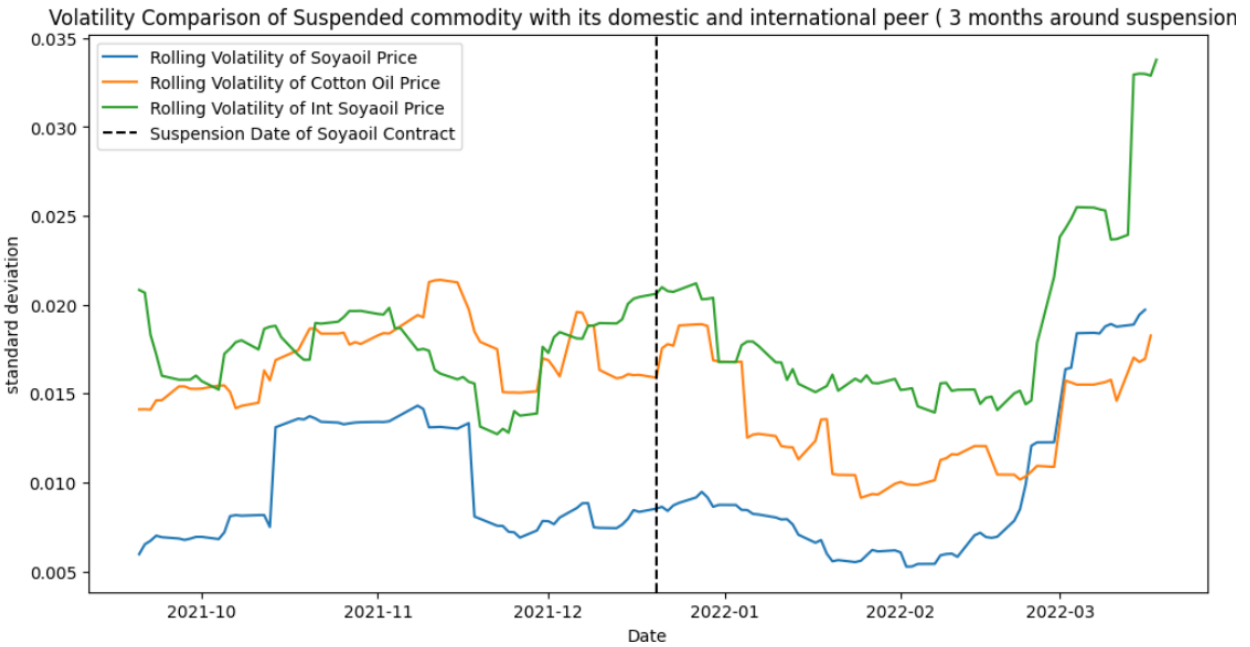


Fig 2.19a Soy oil, 3 months around suspension

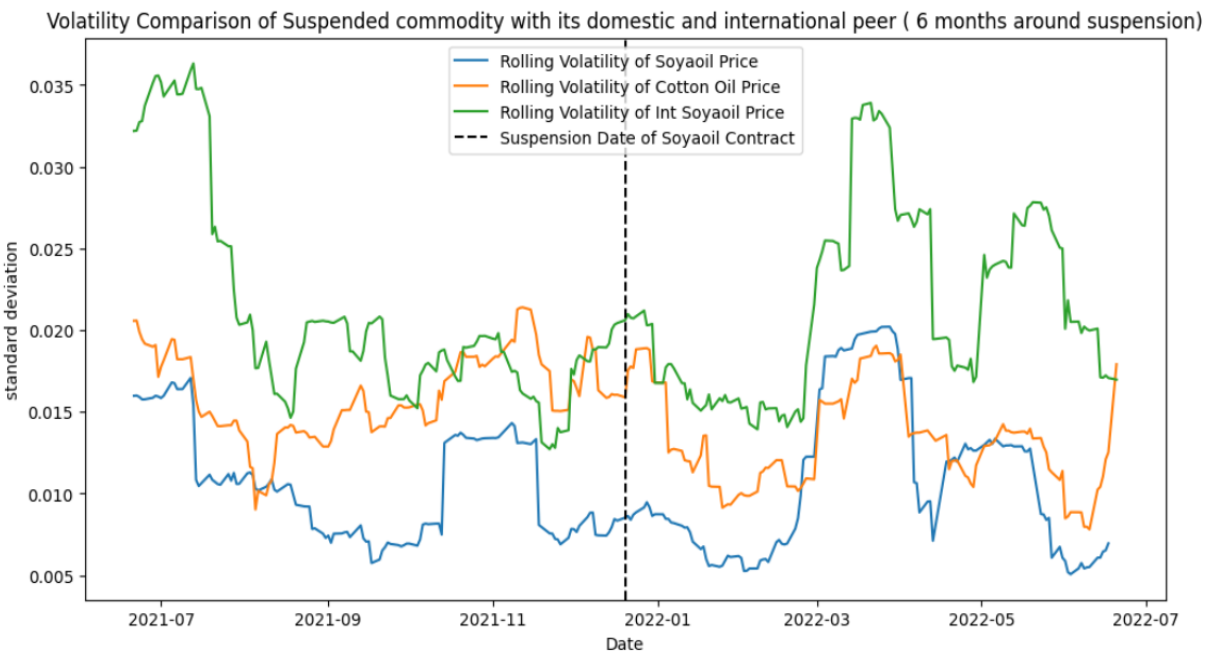


Fig 2.19b Soy oil, 6 months around suspension

Volatility Comparison of Suspended commodity with its domestic and international peer (3 months around suspension)

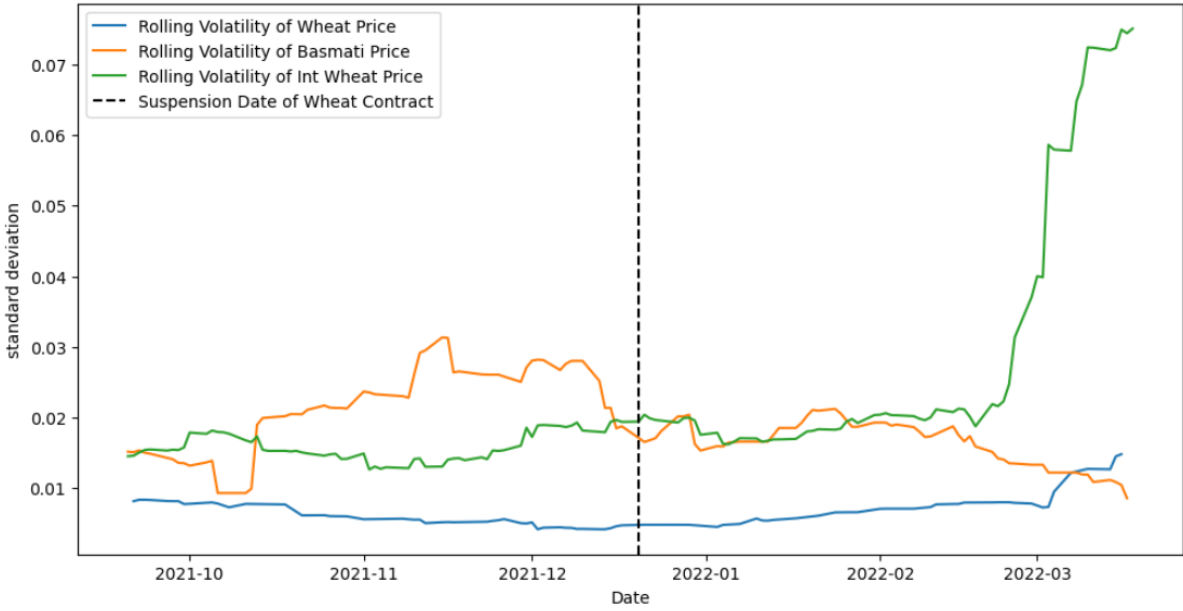


Fig 2.20a Wheat, 3 months around suspension

Volatility Comparison of Suspended commodity with its domestic and international peer (6 months around suspension)

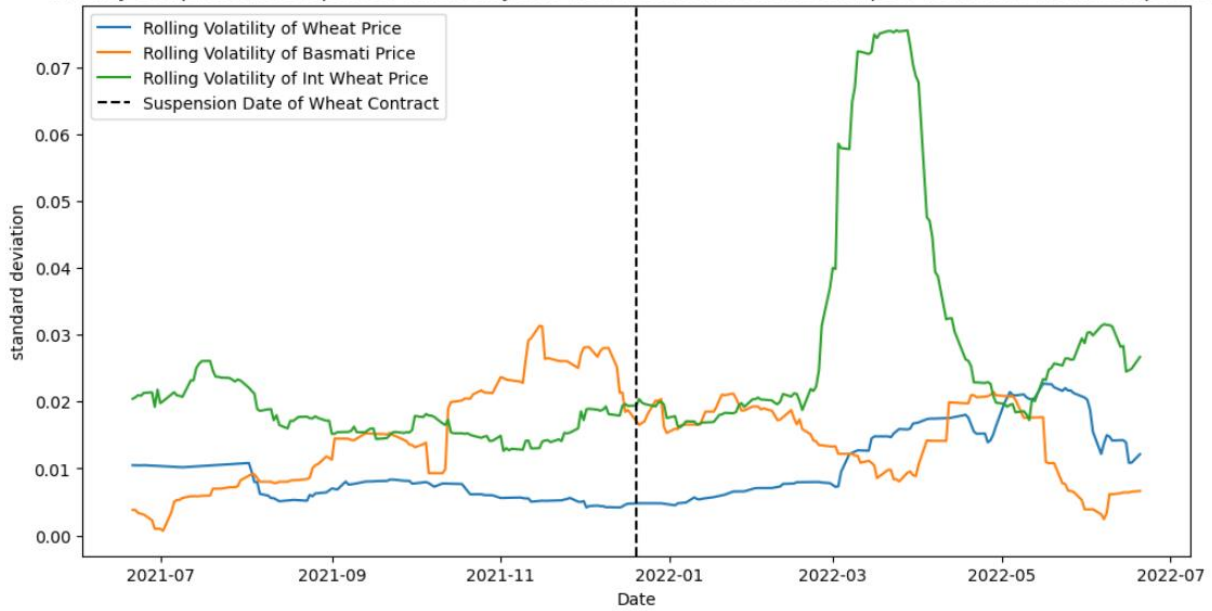


Fig 2.20b Wheat, 6 months around suspension

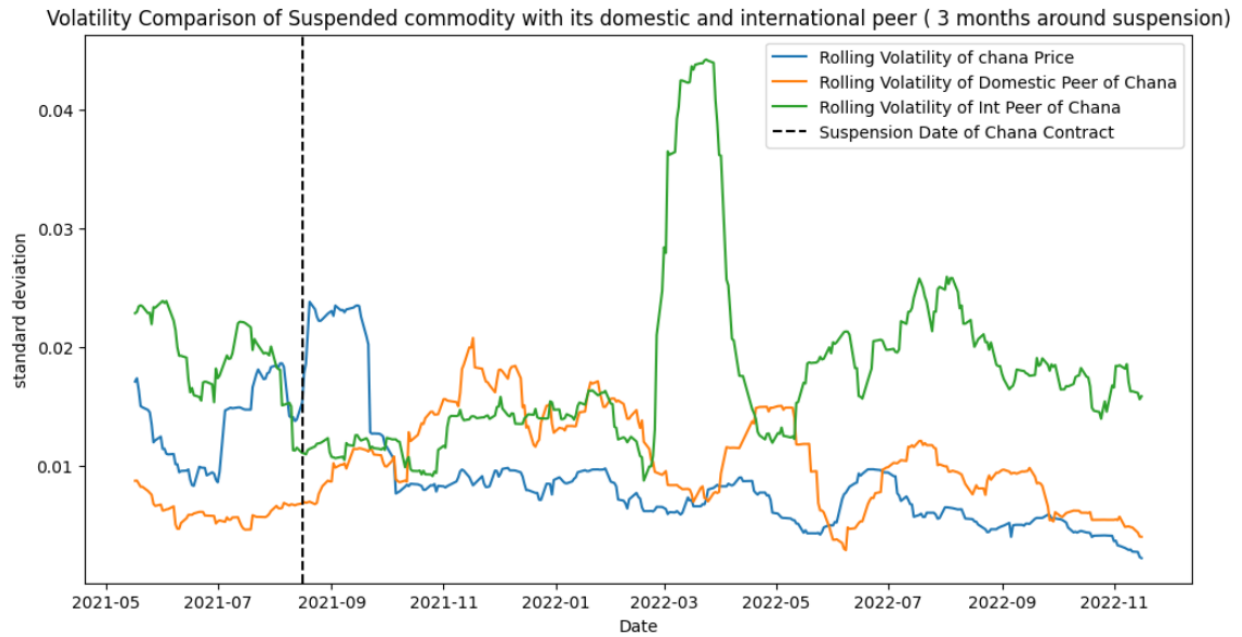


Fig 2.21a Chana, 3 months around suspension

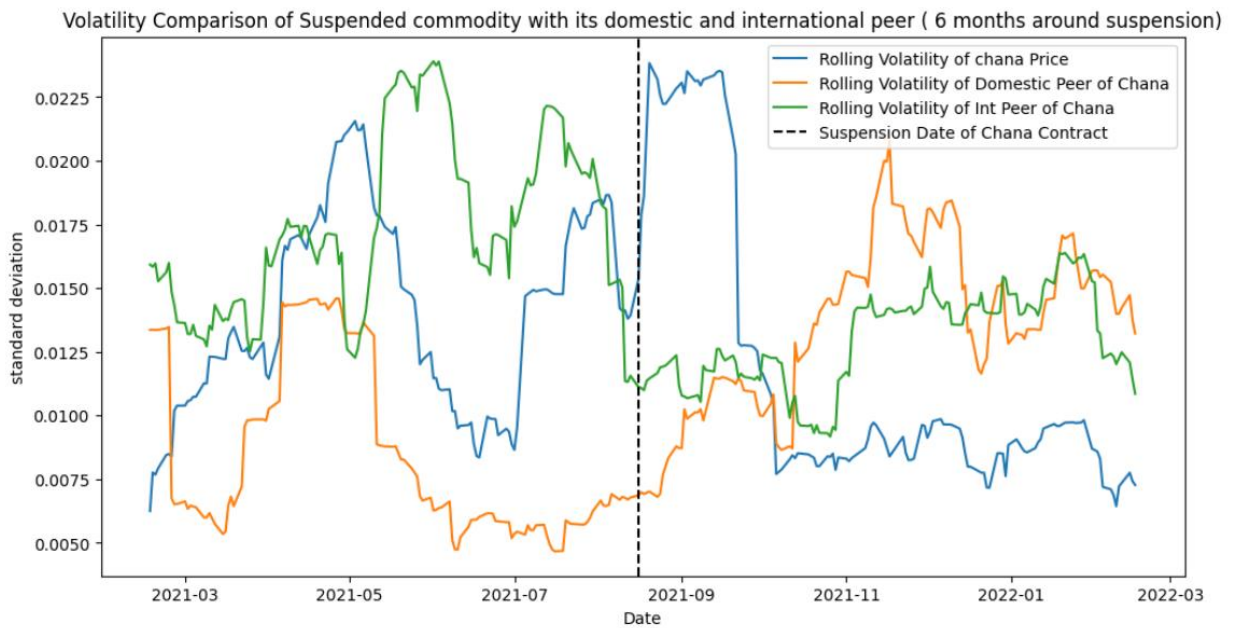


Fig 2.21b. Chana, 6 months around suspension

Groundnut has been taken as a domestic peer for oilseeds-mustard and soy oil. Canola and international soy oil have been taken as international peers respectively for mustard and soy oil. For wheat, we took Basmati (paddy) as domestic peer and international wheat as international peer, for chana, we took tur and masoor as domestic peers.

From the foregoing discussion, it is evident that volatility of mustard seed spot return keeps on rising since its suspension and it surpassed the volatility of groundnut oil prices return after 2 months of its suspension. At the end of December 2021 volatility of mustard spot returns rose even higher and remained high till mid-April 2022 and in this period volatility of mustard remained higher than that of its domestic and international peers. Hence, there is no convincing evidence that suspension has brought down the volatility of mustard seed prices.

Volatility of soy oil cooled down a bit before the suspension and it went up two months after suspension, and this rise is accompanied with rise in volatility of its domestic and international peers. One interesting observation is that volatility of spot price return of soy oil is moving closely with that of groundnut (domestic peer) and its international peer. Therefore, two months after suspension, volatility of international soy oil price return, groundnut and domestic soy oil all surged together.

If suspension really had reduced the volatility in spot prices of mustard, volatility should have remained lower than pre suspension level, but it was not the case. Hence, suspension has no impact on soy oil volatility as it moves with the volatility of its peers. By contrast, volatility of wheat remained stable over time before and after suspension. After the suspension in 2021, volatility did reduce rather remained at the pre suspension level. It registered an increase after three months of its suspension when volatility of international wheat shot up. This suggest that if suspension had been effective, then volatility should have reduced, which was otherwise.

2.3.7 Speculation

In futures trading, unlike forward contracts, the underlying is rarely actually delivered and the participants square off their position before the expiry date of the contract. The contracts are standardized and with high liquidity, transaction costs are low resulting in multiple buying and selling of the contracts. Hedgers with storage constraints participate in the futures market to manage price risk, and hedging is based on expectations of participants about the future direction of prices of the underlying commodity. Those expecting the prices of the underlying to rise would

buy ETCDs and those expecting the prices to fall will sell. Squaring off of position is achieved by an opposite transaction before the contract's expiration date.

Speculation is present in the form of participants betting on future movement of the commodities and play an important role in assuming the risk of hedgers. It is well known that speculators prefer futures contracts as they do not have a stake in physical commodities and find it easy to offset their positions to book profits. Arbitrageurs on the other hand, expect to benefit from differences in prices between different markets or contracts of different expiry dates, playing a role in attainment of convergence between futures and spot prices in principle.¹⁵

To measure the extent of speculation in the futures market, we have taken the ratio of traded volume to open interest as a proxy of speculation.¹⁶ We have analyzed the period from July 2017, when the suspension was revoked for most commodities, to July 2021, when the suspension began to be reimplemented for some commodities. By December 2021, the suspension was fully implemented for all remaining commodities. However, for wheat we have taken the period from April 2011 to July 2015 because between 2017 to 2021 trading for wheat was dormant. First, we plotted the speculation ratio for all commodities over time. Then, we tested for Granger causality from speculation to spot price to check whether high speculative trading in the futures market leads to higher spot prices. Fig 2.22-2.26 shows the measures of speculation i.e. speculation ratio for the suspended commodities of interest. It is evident that apart from soy oil, the other commodities do not exhibit an increase in speculation.

¹⁵ It should be noted that in India, derivatives contract of any commodity is anchored at one particular centre or location— basis center. For example, soybean - Indore, Castor - Deesa, Guar Seed - Jodhpur, Turmeric - Nizamabad. Further, there are also multiple additional delivery center (ADC) defined for different commodities, for e.g. Soybean: Akola or Kota as ADC, where delivery can take place apart from pre-defined basis center. Premium/discount are also announced for delivery at ADC. Final settlement price at the expiry of the contract is determined based on the spot price at pre-defined basis center. However, if maximum deposit is at ADC, delivery would also take place from such ADC, which would definitely be factored in the futures price. This may like to futures either trading in contango or backwardation, wherein convergence may not be achieved. (Source: Based on personal discussion with NCDEX).

¹⁶ A recent study attempting to study suspension of ETDCs (Dey and Gairola 2023) also uses a similar ratio of speculation which is intuitive.

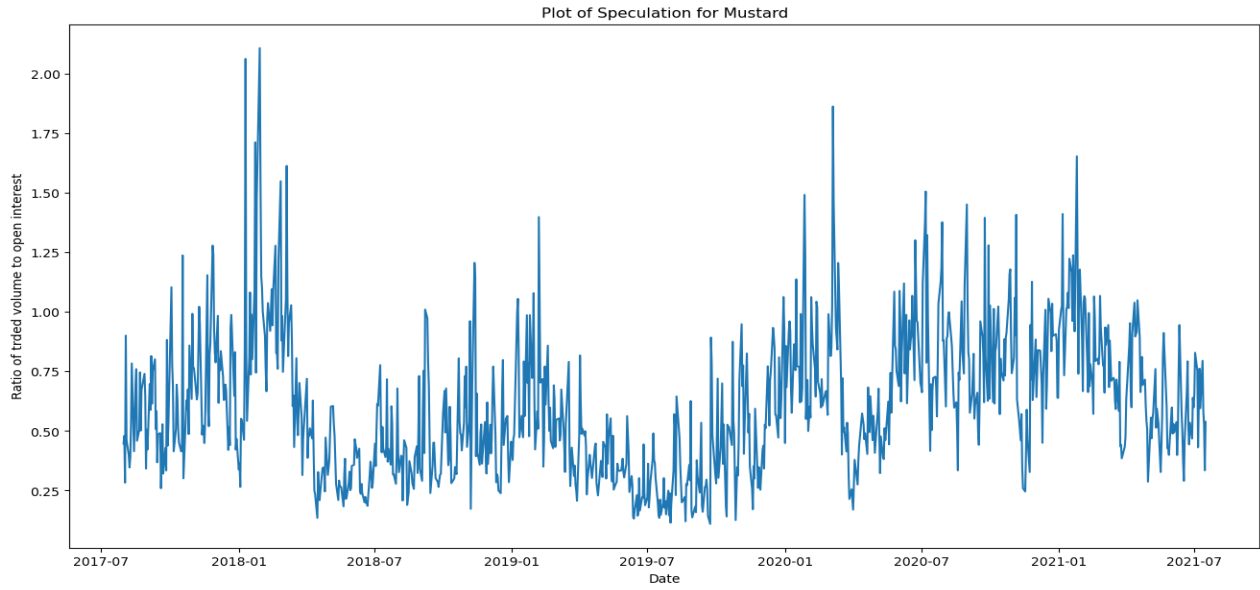


Fig 2.22 Speculation for mustard: 2017 to 2021

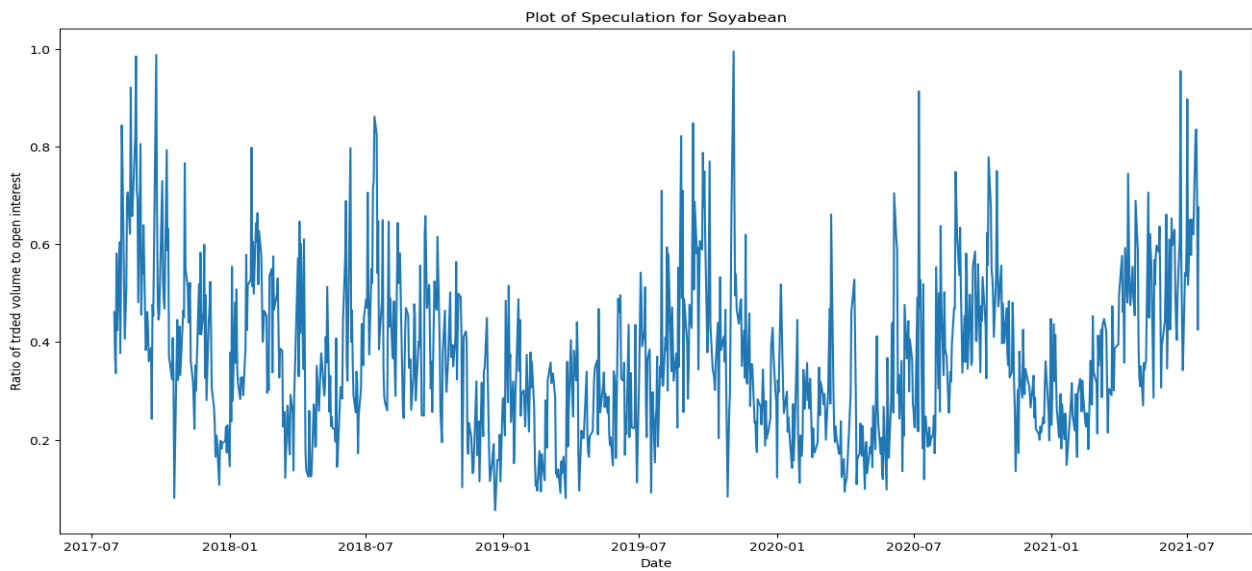


Fig 2.23 Speculation for soybean: 2017 to 2021

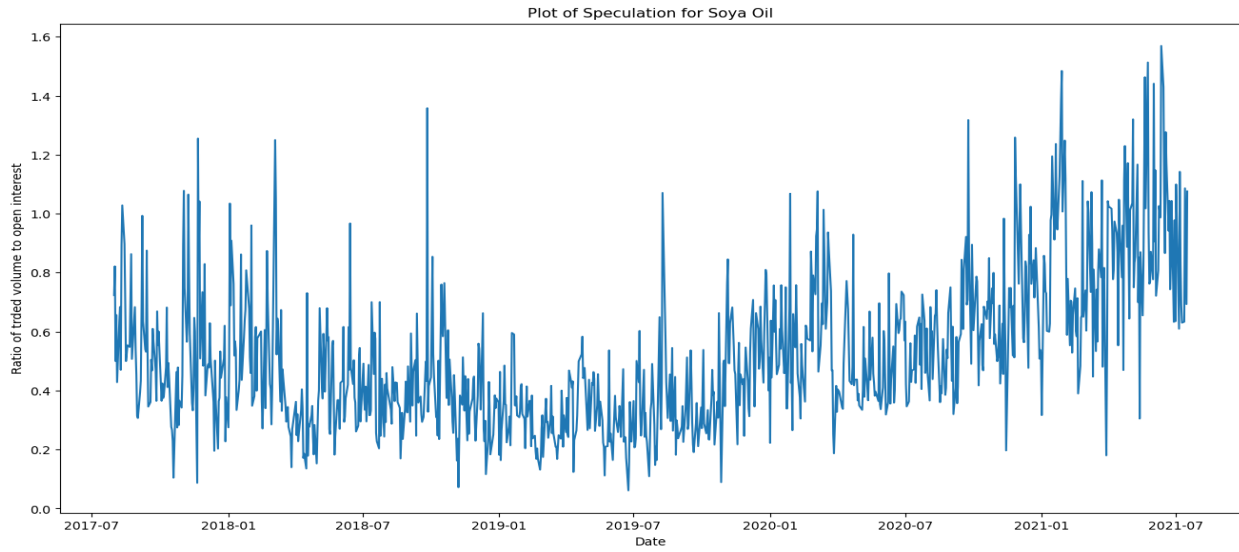


Fig 2.24 Speculation for refined soy oil: 2017 to 2021

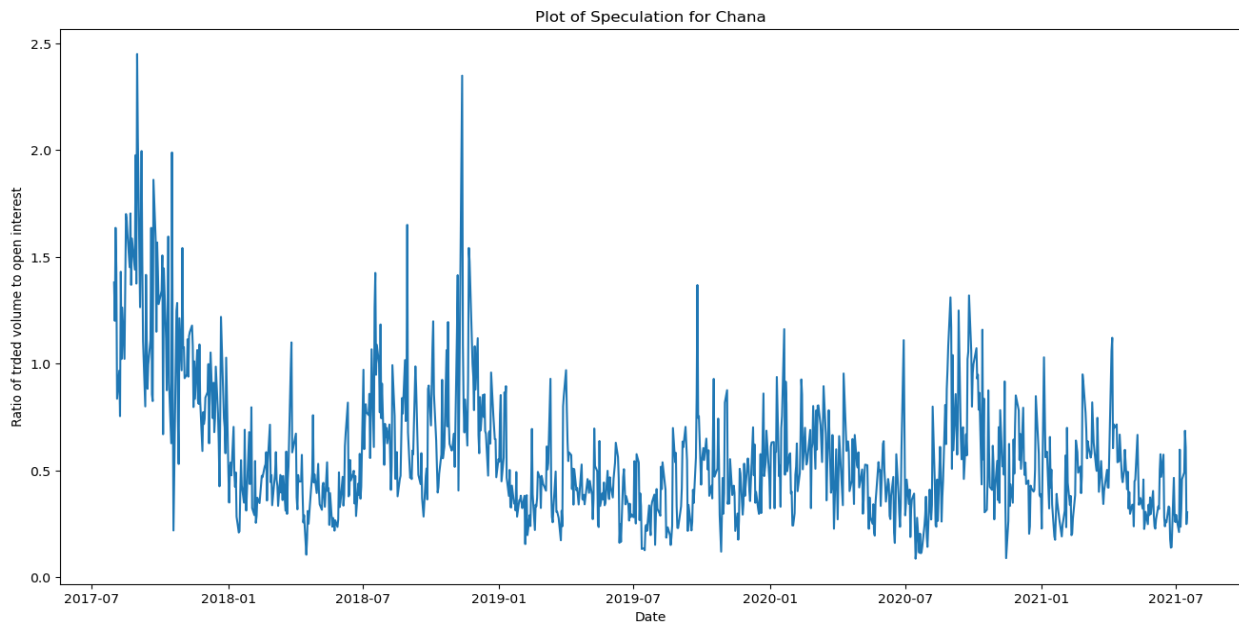


Fig 2.25 Speculation for chana: 2017 to 2021

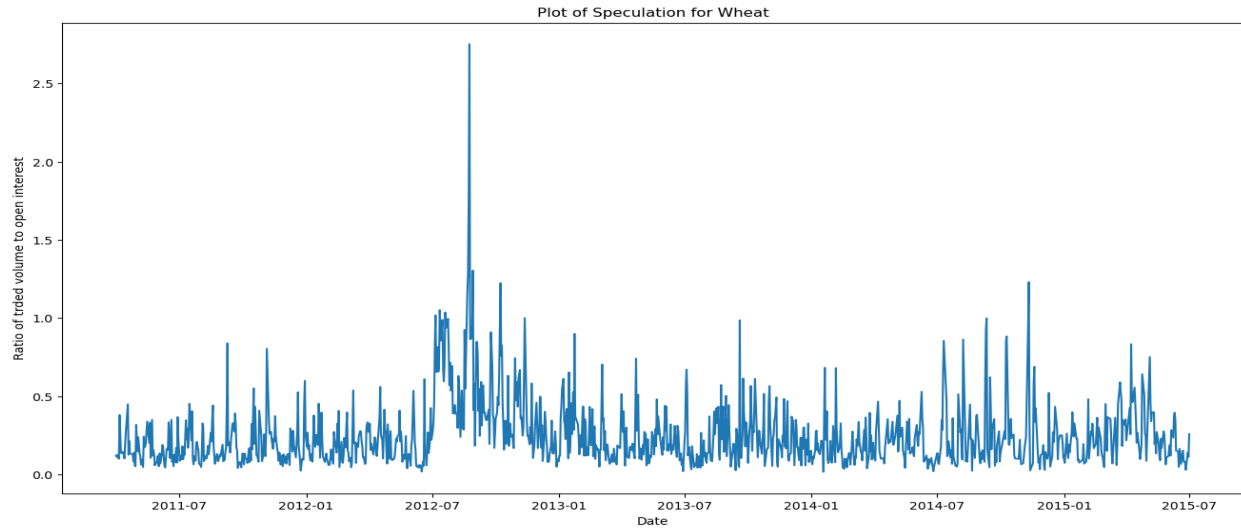


Fig 2.26 Speculation for wheat: 2011 to 2015

For the test of Granger causality between speculation and spot prices for the respective commodities, our null hypothesis is that **speculation does not Granger cause spot prices**. Based on the p-value at different lag order given below in Table 2.13, we **reject the null hypothesis only for refined soy oil**.

Table 2.13 Granger Causality Results for all the Commodities

Commodities	P value at lag order 1	P value at lag order 3	P value at lag order 5
Mustard	0.840	0.490	0.490
Soybean	0.820	0.820	0.890
Refined soy oil	0.020	0.000	0.001
Chana	0.210	0.190	0.120
Wheat	0.280	0.230	0.100

2.3.8 Relationship between international and domestic prices of soybean oil

As there has been insights that soybean and soy oil follow international prices of its peers. To verify that we analyze the relationship between domestic soy oil with international soy oil. We checked if international soy oil prices Granger cause domestic soy oil prices and also if both series are cointegrated. Since units of trade and currency are different for both variables, that makes a naive comparison problematic. To eliminate the difference of units and currency, we converted the both series to cumulative return series, then normalized it to 100 at the beginning of the period. Fig 2.27 shows the plot of normalized cumulative series.

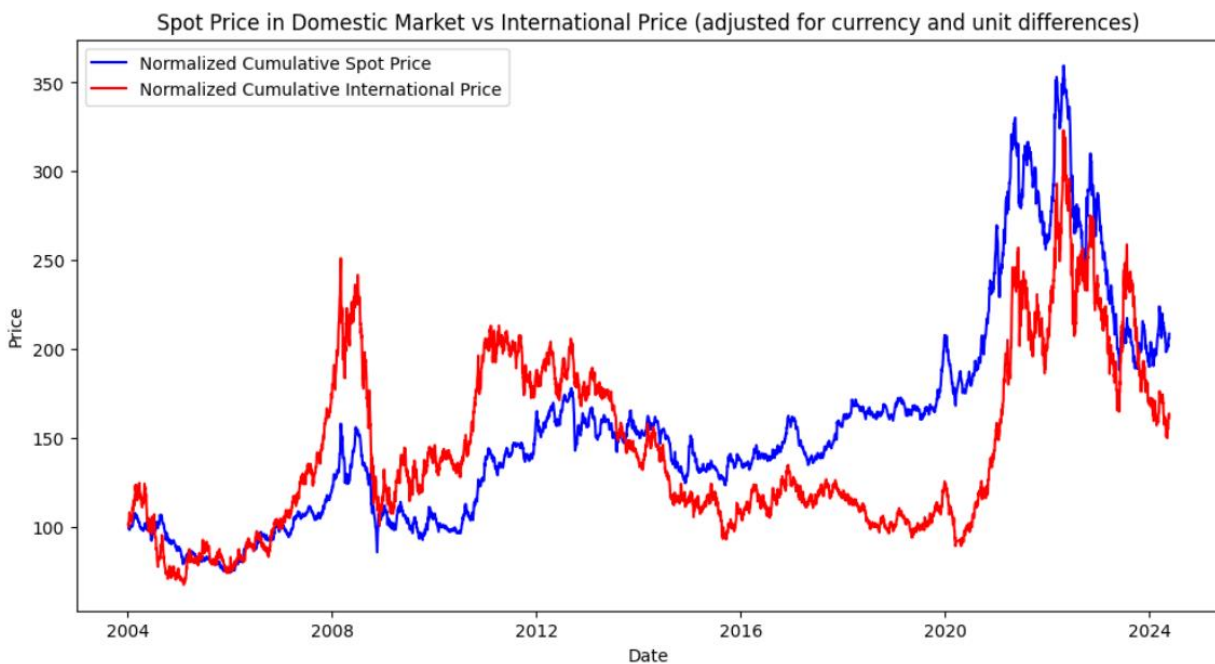


Fig 2.27 Spot price in domestic market and international price for soy oil

Note: Time frame covered is from 2004 to mid-2024. Data on international price of soy oil was provided by NCDEX.

Results of the Granger causality test from international price of soy oil to domestic price of soy oil reported in Table 2.14 show that we have evidence to reject the null hypothesis that international soy oil prices do not Granger cause domestic soy oil prices. However, we fail to reject the null hypothesis of lack of cointegration of the two series (Table 2.15).

Table 2.14 Granger causality test for international price of soy oil causing domestic price of soy oil

Granger Causality	Lag order	P-Value
International price of soy oil does not Granger cause domestic price of soy oil	1	0.000

Note: lag order 1 is optimal lag, causality test is applied on first difference of both series.

Table 2.15 Cointegration between international price of soy oil and domestic price of soil oil

Cointegration	Cointegration Test	P-Value
International price of soy oil and domestic price of soy oil series are not cointegrated	Engle-Granger cointegration test	0.750

2.3.9 Impact of Suspensions on Development of Commodity Futures Market

As discussed in Chapter 1, commodity futures trading in India commenced in 2003 with earnestness. However, since its introduction, the futures market has witnessed multiple instances of suspensions and restrictions. These interventions by the government (and regulator) disrupt the development of the commodity futures market. To verify this, we observed the average daily trade volume before the suspension and post relaunch of ETCD. Table 2.16 shows that frequent suspension instances hurt the market sentiments and reduces the liquidity of trade after relaunch of contracts.

Table 2.16 Relationship between suspension instances and liquidity post-relaunch

Commodities	Introduced Year	Suspension Date	Suspension revoked	Average Daily Traded Volume before suspension	Average Daily Traded volume after sus
Chana	April 2004	May, 2008	Dec, 2008	2,79,580	1,33,700
Chana	April 2004	June, 2016	July, 2017	1,36,210	50,580
wheat	July 2004	Feb, 2007	May, 2009	58,174.4	57,650.4
Soy oil	December 2003	May, 2008	Dec, 2008	39,600	1,25,520

Note: We have excluded mustard seed and soybean from our analysis because both have not witnessed relaunching.

It is noticeable in Table 2.16 that average daily traded volume, for all commodity futures has dropped after the relaunch in comparison to pre suspension level.

This supports the claim that such interventions by the government (through the regulator) discourage the development of commodity futures market.

2.3.10 Difference in Differences Estimation of Comparative Volatility of Suspended Commodities

In addition to analyzing volatility and trade volume compression before and after the suspension to assess its impact, we have expanded our study by applying the difference-in-differences estimation to further evaluate the suspension's effects. We, through DID, examined if volatility was higher/lower for suspended commodities after suspension in comparison to its control.

The DID method is a statistical technique used to estimate causal effects of a treatment by comparing the changes in outcomes over time between a group affected by an intervention (treated group) and a group not affected (control group). It helps to isolate the impact of the intervention by controlling for time trends that would have occurred regardless of the intervention.

DID comes with two assumptions-

1. **Parallel Trends Assumption:** In the absence of the intervention, the treated and control groups would have followed similar trends over time.
2. **No Simultaneous Interventions:** No other interventions occurred during the study period that could differentially affect the treatment and control groups.

To fulfill DID assumption, we checked if the volatility trend of the treatment group and that of control group are parallel before suspension. We find that none of the suspended commodities have a parallel trend with its domestic and international controls. While parallel trend assumption is crucial for DID and it is violated in our case, we are still showing the DID results so that we can get a sense if suspension significantly affected the commodity.

Controls are selected in a way that they inherit some common features with treated commodities in terms of preferences by general masses, demand and supply dynamics. For instance, tur (Pigeon pea) is a pulse that can be an imperfect substitute of chana given its production and demand scenarios. Similarly, we took basmati (paddy) for wheat, groundnut oil for mustard and soy oil.¹⁷ It should also be noted that since chana does not have any comparable control in the international market, we chose only domestic control in case of chana.

¹⁷ Groundnut is the only comparable control available in oilseed, palm oil and sunflower oil cannot be taken because of its higher sensitivity to foreign market.

We performed DID estimation for three separate periods- three months before and after suspension, six months around suspension, twelve months around the suspension.¹⁸ Controls taken for DID estimation are mentioned in Table 2.17 and results of estimation are provided below in the table 2.18. Table 2.18 reports the results of DID estimation. The coefficient captures the treatment effect and is interpreted as the effect.

The DID estimation reveals mixed results. We cannot conclude that suspension has decreased the volatility of suspended ETCDs in the post suspension period. For soy oil, we find that the coefficient is not significant for a 3-month window for both domestic and international control. For the 6-month window, volatility was 0.09 % more than that of groundnut but the coefficient is not significant (in case of international soy oil coefficient is again not significant). However, for the 12-month window, volatility of soy oil was 0.18 % more than that of groundnut while volatility of soy oil was 0.29% lower than that of international soy oil.

Mustard seed is also giving very mixed results with different time periods, in comparison with groundnut we didn't find any significant result (all the p values are more than 0.05) but in comparison with international canola we see that volatility of mustard seed has increased by 0.6% and 0.37% (respectively for 6 month and 3 month) after suspension. Wheat volatility has increased by 1.61%, 1.81% (respectively for 3-month, 6 month) post suspension when we taking basmati as control group, but decreased by 1.31% and 0.31% (respectively for 3-month and 12 - month) when we taking international wheat as control group, not counting for the result which are not significant at 5% significance level.

In the case of chana none of the results are coming out significant with tur being in the control group so are not commenting anything about volatility change of chana even though coefficient is negative.

¹⁸ We took the series of 22 days rolling standard deviation as volatility. Volatility of daily return has been taken. For a 3- month window there are approximately 240 observations, for 6 months, there are 476 observations approximately and for 12 months 950 observations approximately. Level of significance taken is 5 %. Volatility is not annualized in this analysis.

2.4 Conclusion

Our examination of the effect of the suspension of ETCD by focusing on five of the seven suspended commodities based on an in-depth analysis of daily series of prices (futures, spot, and retail), volumes, volatility, and speculation suggests that the purported reasons for which the suspension was imposed namely the regulator and central government's concerns about futures trading of ETCDs causing retail inflation is misplaced. The trends in the retail prices of suspended commodities as well as their peers suggest that suspension was based on the presumption of a positive relationship between futures trading and food inflation, which our analysis finds no evidence of. While the operation of MSP in some of the suspended commodities continues unabated, it must be borne in mind that in the absence of futures trading, among several other factors, there is possibility of hikes in MSP being transmitted into inflationary pressure on the general level of food prices.¹⁹

Our analysis reiterates the role of demand-supply gaps, international commodity prices and trade policies in influencing domestic commodity prices and hence food inflation. As a case in point, at the time of writing, there is a significant uptick in food inflation due to supply shocks for fruits and vegetables owing to inclement weather across the country. None of these are traded in the futures market but prices continue to rise. It is surprising then that in the absence of evidence of commodity futures trading causing an uptick in food prices, a different logic namely the suspension of commodity futures trading is invoked.

The general bidirectionality between futures and spot prices of the suspended commodities suggests that futures markets played an important role in signaling directionality to the spot markets and the spot markets in turn influenced the futures prices, thereby providing evidence of an important role that the ETCDs played in price discovery. In terms of speculation in the spot market (measured by speculation ratio) before and after the suspension, only soy oil exhibits an increase whilst in terms of volatility, only wheat spot prices (polled prices) registered a decline in volatility in the post-suspension period. International peer group and domestic peer group analysis of select commodities also suggests that there is more to it than what meets the eyes in terms of

¹⁹ While there are several studies that show that the relationship between MSP and food inflation is positive (e.g. Sekhar *et al.* 2018), there are also a few that show that there is a negative relationship between MSP and food inflation (e.g. Narula 2019, Nair and Eapen (2015).

cointegration and Granger causality of price levels, suggesting the need for deeper examination of transmission mechanisms rather than abrupt regulatory shocks such as suspensions.

From the perspective of extant literature earlier reviewed in the previous chapter, our findings are qualitatively different from those of the Abhijit Sen Committee and RBI (2010) which found no conclusive evidence on relationship between spot and future prices by using data that were concomitant with formative phase of the futures market in India. The Abhijit Sen Committee found urad and sugar to have bidirectional causality in terms of spot and futures prices whilst potato, rubber and chickpea (chana) had Granger causality running from spot prices to futures prices. Srinivasan (2008) found that there was strong correlation among spot and futures prices for the four commodity futures that were suspended in May 2008 namely chana, rubber, soy oil, and potato. However, only potato prices declined following the suspension due to bumper production. The same study also highlighted that international factors including bio-diesel policies of regions on which India's dependence for oil imports are high and domestic fiscal and monetary policies also contribute to food inflation.

Our findings have elements of similarity with that of Aggrawal *et al.* (2023) which studied the suspensions of only chana and mustard seed futures in 2016 and 2021. While the study found no change in price trend even after the suspension, we are able to observe a considerable extension of the trend studied in Aggrawal *et al.* (2023) followed by a dip at a later part of 2022. The study (*ibid*) compared the volume traded with spot prices for the two commodities and found no correlation in both as in the case of our study (for the same two commodities). Furthermore, they constructed a counterfactual using synthetic control method for the post-suspension period and found that prices behaved in the same way had suspensions not occurred. By contrast, we undertake a peer-group comparison to arrive at a similar conclusion albeit for five commodities instead of two.

As is evident from our analysis, in the post-launch period, there is a significant reduction in trading volume for commodity futures that were suspension intermittently and relisted in the past, without the suspension having a dent on commodity prices. These findings are similar to that of Jacob and Gopalkrishnan (2023) who find that market liquidity is significantly lower in the post-relaunch period for specific commodities they studied. The finding shows that the liquidity and the share of the price discovery gained in the market are partly reversed as an outcome of the suspension of ETDCs. The lost momentum observed in building liquidity in the agri-commodities

on account of the suspension of contracts needs to be assessed against the need to develop the Indian commodities markets which has been a crucial policy imperative (Ministry of Finance, 2018).

It can be argued that in the absence of ETCDs to hedge price risk and distortions in price discovery, it is likely that physical market participants associated with the suspended commodities have been adversely affected. However, whether these market participants have experienced pertinent challenges following the suspension and whether all segments of the participants have been equally affected needs to be assessed. Further, in the emerging literature, there is no evidence on the views of farmers and farmer organizations such as farmer producer organizations (FPOs) in the context of the suspension of commodity futures apart from how price discovery and risk hedging are achieved in the absence of non-participation in futures trading; which is a glaring gap that our study attempts to fill.

Having presented our findings and interpretations based on secondary data analysis, we present insights from our primary research conducted among physical market participants across multiple markets and commodities in three states. We believe that a synthesis of the insights from the primary research and secondary data analysis bodes well for arriving at specific conclusions and policy recommendations.

Chapter 3 Insights from Primary Research based on Interaction with Physical Market Participants

3.1 Introduction

Having presented the results of secondary data analysis which largely focused on time series analysis of futures prices and spot prices to answer the questions pertaining to the effect of suspension of ETCDs on the agri ecosystem, in this chapter, we present insights from month-long primary research of several participants of commodity value chain across three states of India in Kharif 2024 season. We also attempt to synthesize the evidence from the literature including two recent studies on effect of the commodity futures suspension as well as our contextualization of the evidence in the dynamics of macroeconomic and international commodity market developments.

We find that across the three states where our study was conducted, the experience of physical market participants in the futures market suggests that there has been more harm than good rooted in the suspension of ETCD trading since December 2021. While challenges in price discovery and risk hedging are clearly evident from the survey as well as key stakeholder interactions, it is also evident that most consider agricultural commodities derivatives trading as an important component of the country's agricultural markets deepening and integration with the growing digital infrastructure and agricultural market reforms.

The rest of the chapter is organized as follows. In section 3.2 we describe the methodology of primary research. Section 3.3 reports the findings from the survey of market participants as well as non-participants including FPOs in the three states where the study was conducted. Section 3.4 presents our inferences based on semi-structured interviews of key stakeholders. Section 3.5 concludes with our recommendations and policy implications regarding the suspension of commodity futures.

3.2 Methodology of Primary Research

Our primary data collection comprised interactions with physical market participants namely, those who have participated in futures trading as well as those \ commodity value chain participants who have no experience of futures trading. In particular, we had in-depth interviews of farmers and FPOs in different parts of the three states of interest.

We relied on a **purposive sample** for the following reasons. First, there is no public information about participants engaging in or who would have engaged in futures trading. Second, for the commodity of interest, consultation with subject matter experts suggested that we can focus on specific commodities for specific states. This introduced an additional problem of getting a sampling frame of participants and non-participants in the respective state. Accordingly, we relied upon publicly available lists of traders, producers, stockists, processors, manufacturers, agribusiness corporates, industry associations, farmer producer companies (FPOs) and CBBOs. We also sampled respondents from a list of physical market participants provided by NCDEX and agencies in the three states.

Between **June and July 2024**, we reached out to physical market participants in three states: Maharashtra, Madhya Pradesh, and Rajasthan. Based on the considerable liquidity of the contracts at the time of the suspension and importance in the food consumption basket, **we decided to have a state and commodity-specific focus for the five suspended commodities as indicated.**

- i. Mustard seed (Rajasthan)
- ii. Refined soy oil (MP)
- iii. Soybean (MP and Maharashtra)
- iv. Chana (MP, Maharashtra, Rajasthan)
- v. Wheat (MP and Rajasthan)

Since these commodities are focused in specific states, they do not reflect the general distribution of commodities handled by physical market stakeholders in all states of the country, and such generalizations should be refrained from. The participants in our survey were a combination of participants shared by NCDEX, publicly available listings, as well as nodal agencies for the studies and government departments. An attempt was made to sample an

appropriate number of respondents for the major suspended commodities. Out of over 80 survey responses, we have **71 valid responses** from the survey for our quantitative analysis.²⁰ In addition, we conducted several **key stakeholder interactions in the form of in-depth interviews of physical market participants. We also conducted a survey of 30 FPOs and CBBOs out of which 22 valid responses inform** our analysis significantly. To protect the identity of the study participants, we have maintained strict anonymity throughout the report.²¹

The list of respondents in our study consists of those among the broader list who gave their consent to participate in the study. We relied on both structured (see Annexure A) and semi-structured questionnaires for key stakeholder interactions. Following our pilot surveys to improve the design of the questionnaires, we began our surveys in the month of June. The structured questionnaires were administered by trained investigators using KOBO tool. In a few cases, respondents emailed us their responses.

3.3 Insights from Survey of Physical Market Participants

3.3.1 Sample characteristics

For the econometric analysis, we rely on usable data from survey of 71 physical market participants across Rajasthan, Madhya Pradesh, and Maharashtra. These firms often play multiple roles: most are involved in trading and brokering, 21 provide warehousing, 10 focus on processing, 55 act as wholesalers, and 26 handle distribution. Additionally, over half are engaged in export and import activities. Although all respondents are registered, only three are listed on a stock exchange. These partners manage multiple commodities simultaneously: 15 handle soybean and soy oil, 47 deal with Chana, 44 with wheat, and 56 with mustard and mustard oil. As discussed earlier, these commodities are focused in specific states and do not reflect the general distribution of commodities handled by physical market stakeholders in all states of the

²⁰ In total, we reached out to around 120 firms in different locations in the three states for the survey, out of which 80 gave their consent to participate in the study. From these 80 surveys, 71 survey forms could be validated based on our follow up with investigators in the field. Such low response rate in surveys of firms where sensitive information about financial matters as well as participation in commodity exchange trading is not surprising. Other reasons for non-response ranged from non-availability of informed decision maker in the firm as well as time constraints of the potential respondents during investigator visit.

²¹ Given the sensitive nature of information shared by the participants, no personal identifier of the respondents is available with anyone other than the Principal Investigator, and it cannot be shared upon request. Appropriate measures for confidential and data protection have also been ensured.

country. Of the 71 respondents, 46 are associated with a commodity exchange as clients or members.

Table 3.1 reports the major businesses handled by the firms that the respondents represent. Most of are involved in sourcing and procurement, followed by storage, distribution, and packaging. There are overlapping activities carried out by the firms.

Table 3.1: Major businesses handled by physical market participants

Major Business	Number of Respondents
Sourcing and Procurement	63
Processing and Manufacturing	14
Quality Control	27
Packaging	35
Storage of raw and finished goods	47
Own logistics and distribution	40
Research and development facility	9
Risk management (Hedging in commodity markets)	6
Others	1
N	71

Note: Multiple responses allowed per respondent.

3.3.2 Aspects of Suspension of ETCs

We asked respondents about the primary, secondary, and tertiary factors in order of importance in terms of what the respondents think generally contributes to the price volatility in the commodities they handle. **Weather and climatic conditions emerged as the most important primary factor followed by demand-supply dynamics and global economic conditions.**

Unsurprisingly, those engaged in import and export also reported the currency fluctuation as a factor in influencing price volatility. Interestingly, this is corroborated by our secondary data

analysis in Chapter 2 that found the fundamental role that demand supply mismatch and weather conditions play in influencing prices as well as volatility in spot markets.

In terms of the effect of the suspension on exchange trading of ETCs on different aspects of their operation, **the most critical effect seems to be in terms of cost escalation.** An overwhelming majority of the respondents reported increase in costs for storage, grading, interest, transport, handling costs. 34% reported an increase in cost due to waste and losses whereas 48% reported losses due to depreciation. Nearly 70% also reported a rise in operating cost following the suspension of the commodities. While we do not have reasons to believe that such cost escalation can be causally attributed to the suspension of futures trading in December 2021, there are inherent welfare costs across the agri ecosystem that may be associated with inefficient price discovery and risk hedging strategies associated with the suspension. Furthermore, industry specific factors need a deeper investigation.

We have no reason to believe that most respondents lacked awareness of the futures market and its developments, given that 56 respondents reported being aware of futures market trends and 46 were aware of the suspension of futures contracts (ETCs). While the determinants of participation in the futures market will be analyzed later, it is important to recognize that awareness alone is not enough; we must also consider the depth of that awareness.

As indicated in Table 3.2, 30 respondents reported having a moderate to advanced understanding of the futures market, while 9 claimed to have expert-level knowledge. In contrast, 8 respondents had only a basic understanding, and 9 had limited awareness of ongoing developments in the futures market. Overall, approximately 35% of respondents possess advanced or expert-level understanding, which is lower than expected for businesses at this operational level.²² This suggests a potential gap in the necessary expertise that could impact effective participation in the futures market.

²² Fieldwork suggests that all these respondents had knowledge of long and short position apart from awareness about different concepts of limits and margins whereas there is variation in awareness about different parameters of standardization.

Table 3.2 Understanding and awareness about futures market and trends

	Number of respondents
Limited understanding and awareness	9
Basic understanding with some awareness of changes	8
Moderate understanding with good awareness of changes	14
Advanced understanding with thorough awareness of changes	16
Expert level understanding with comprehensive awareness of changes	9
N	56

To better understand how firms manage price risks following the suspension, we asked participants to identify their top three strategies. The findings reveal that the **most common primary strategy is using futures contracts in the domestic market**, though these are for commodities other than the one under suspension.

This preference for futures contracts highlights their significance in managing price volatility for other commodities. Closely following futures contracts, stock holding and forward contracts also emerge as widely adopted primary strategies. Among secondary approaches, firms frequently turn to stock holding, futures contracts, forward contracts, and long-term agreements with both suppliers and customers. When it comes to tertiary strategies, long-term contracts, and inventory management become critical tools for mitigating price risk. The consistent reliance on stock holding across different strategic levels post-suspension underscores its pivotal role in price risk management that may lead to inflation, making it a cornerstone of the firms' approaches to navigating market uncertainties (Table 3.3).

Table 3.3 Price risk fluctuation management strategies

	First strategy	Second strategy	Third strategy
Forward contracts	13	11	7
Futures contracts in the domestic market	27	12	3
Futures contracts in the international market	5	1	4
Stock holding	13	24	8
Long term contracts with suppliers and customers	6	11	24
Goods insurance	3	7	9
Inventory management	4	5	11
Others	0	0	5

Total respondents=71

Regarding participation in futures trading, approximately one-third (35.2%) of respondents reported having engaged in the futures market either currently or in the past. Almost all of them indicated that affordability was not a constraint, noting that the required margins were manageable. When asked about the proportion of their commodity turnover traded in futures market lots, the most common response was 25-50%. We also explored the challenges faced on futures platforms, with respondents primarily highlighting limited hedging opportunities as a significant issue, followed by difficulties in accurately tracking futures prices.

From the perspective of participants in futures markets, we asked them to give us a sense of how they would rank the benefits from participation in futures markets. **Better price realization is the most important first benefit from participation followed by price information. Among the responses received regarding the second benefit from participation, risk mitigation (hedging) followed by price realization and price information were reported as important.**

For respondents aware of the suspension of ETCDs, we asked them to rate the impact of this suspension on various aspects, including financial stability, the ability to secure stable and fair prices, market access, and risk management practices. As shown in Table 3.4, the suspension **had significant impact on financial stability**, with 36 out of 46 respondents reporting either significant or moderate effects on this dimension. Additionally, 42 respondents indicated that their risk management practices were notably disrupted. **The suspension also affected the ability to secure fair and stable prices, as well as market access and participation.**

Interestingly, Table 3.5 also reveals that some respondents experienced only slight or no impact across these dimensions, pointing to a degree of resilience among certain firms. This variation in impact could be attributed to differences in firm size, diversification strategies, or alternative risk management practices.

Table 3.4 Impact of futures suspension

	Significantly	Moderately	Slightly	No impact
Financial stability impacted	16	20	10	
Ability to secure fair prices impacted	22	15	5	3
Ability to secure stable prices hindered	11	24	7	4
Market access and participation disrupted	18	16	10	1
Risk management practices altered	24	10	8	4

Note: Only a single response is allowed.

There was a near match between significant negative influence and no influence of suspension on firms' ability to access credit and financial resources. The significant negative influence is

likely to be associated with a disruption in warehousing financing that the specific participants would have been benefiting from during the futures trading period.

We also asked respondents for suggestions or feedback on futures regulations in the agriculture sector. **Of the 46 respondents, 41 emphasized the need for capacity-building initiatives and support.** While exchanges have implemented several awareness campaigns, respondents noted a persistent issue with the level and depth of awareness, which must be addressed to improve participation. Many respondents, particularly those representing small and medium firms, stressed the importance of targeted awareness programs. Additionally, almost all respondents called for greater government support and consistency in commodity market regulations and policies.

3.3.4 Econometric Results

We employed probit regression to analyze the factors influencing the probability of a firm participating in the futures market. This approach allows us to identify the key determinants of such participation. The model used to estimate the probability of participation is specified as follows:

$$P(Y = 1|X) = \varphi(\beta_0 + \beta_1X_1 + \beta_2X_2 \dots + \beta_nX_n) \quad (1)$$

Where φ denotes the cumulative distribution function of the standard normal distribution and X_i are explanatory variables and β_i ($i=1, 2, \dots, n$) are corresponding parameters. β_0 denotes the intercept term. The dependent variable Y can have only two possible outcomes namely 0 or 1, while the explanatory variables i.e X s can be dichotomous or continuous.

The same model specification as in equation (1) is applied to estimate the perceived impact of suspension on operational costs as escalation of operational cost has emerged as a major concern for the respondents in the survey. For assessing the perceived impact of suspension on three outcomes of interest financial stability, risk management, and price stability—where the variables are ordinal (No impact, Marginal negative impact, Moderate negative impact, Significant negative impact)—an ordered probit model is utilized with the following specifications.

$$Y^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \dots + \beta_k X_k + \varepsilon \quad (2)$$

Where Y^* is a latent continuous variable and X_i are independent explanatory variables and β_i are corresponding parameters. ε is the error term, assumed to be normally distributed $\varepsilon \sim N(0, 1)$. The observed ordinal variable Y can be linked to Y^* by threshold points of ordinal categories.

Table 3.5 reports is the list of variables with description that are used in probit and ordinal probit model.

Table 3.5 Variable description

Variable name	Description of variable
Commodity market participation (Yes or No)	Dichotomous variable with value of 1 if firm participated in futures market and value of 0 if firm do not participate
Registered firm (Yes or No)	Dichotomous variable with value of 1 if firm registered and value of 0 if firm do not register
Collective purchasing from farmers (Yes=1)	Dichotomous variable with a value of 1 if the firm engages in collective purchasing from farmers and 0 otherwise

Collective purchasing from intermediaries (Yes=1)	Dichotomous variable with a value of 1 if the firm engages in collective purchasing from intermediaries and 0 otherwise
Business role (Processor=1)	Dichotomous variable with a value of 1 if the firm is involved in processing and 0 otherwise
Business activity (Sourcing and Procurement=1)	Dichotomous variable with a value of 1 if the firm is engaged in sourcing and procurement and 0 otherwise
Business activity (Packaging=1)	Dichotomous variable with a value of 1 if the firm is involved in packaging and 0 otherwise
Business activity (Storage=1)	Dichotomous variable with a value of 1 if the firm is engaged in storage and 0 otherwise
Business activity (Logistics and distribution=1)	Dichotomous variable with a value of 1 if the firm is involved in logistics and distribution and 0 otherwise
Suspension awareness (Yes=1)	Dichotomous variable with a value of 1 if the firm is aware of the suspension and 0 if the firm is not aware
Risk management (Long term contract with suppliers and customers (Yes=1)	Dichotomous variable with a value of 1 if the firm uses long-term contracts with suppliers

	and customers as a risk management strategy and 0 otherwise
Risk management (Forward contract (Yes=1))	Dichotomous variable with a value of 1 if the firm uses forward contracts as a risk management strategy and 0 otherwise

3.3.4.1 Results of Probit Estimation

Table 3.6 presents the results of the probit regression analyzing factors influencing participation in the commodity derivatives market. Registered firms are 28.1% more likely to engage in the commodity derivative market compared to their non-registered counterparts. However, firms that collectively purchase from farmers are 25.9% less likely to participate in futures markets. In contrast, firms involved in collective purchasing from intermediaries show a higher likelihood of engaging in derivative markets.

Processors and firms involved in packaging activities have a 47.4% and 20.4% higher likelihood of participating in the commodity derivative market, respectively. Conversely, firms engaged in storage activities are less likely to participate. These findings highlight the varying impacts of different business roles and activities on participation in the commodity derivative market, emphasizing the importance of registration status and specific business functions.

Table 3.6 Participation in the commodity derivative market (Marginal effects based on Probit Regression)

Dependent Variable	Commodity market participation
Registered firm (Yes or No)	0.281*** (0.070)
Collective purchasing from farmers (Yes=1)	-0.259* (0.140)
Collective purchasing from intermediaries (Yes=1)	0.222** (0.090)
Business role (Processor=1)	0.474*** (0.180)
Business activity (Sourcing and Procurement=1)	-0.24 (0.170)
Business activity (Packaging=1)	0.204*** (0.080)
Business activity (Storage=1)	-0.142* (0.080)
Business activity (Logistics and distribution=1)	0.142 (0.090)

Note: Robust standard errors are in parentheses, * p<0.1, ** p<0.05, *** p<0.01

Valid responses for the regression is 69.

The results highlight a notable difference in how these physical market participants perceive the impact of the suspension of futures contracts on storage costs, influenced by their participation in the futures market and their awareness of the suspension. Firms participating in the futures market are 28.6% less likely to report an increase in storage costs after the suspension, suggesting that **futures market involvement may provide some protection against rising storage expenses.**

This can be attributed to the fact that before the suspension, firms were using futures contracts to hedge against price volatility and thus did not need to hold large inventories. As a result, their storage costs were lower. It can be inferred that after the suspension, without these hedging tools, firms are compelled to hold inventories for longer periods to manage risk, leading to increased storage costs. In contrast, firms that are aware of the suspension are 41.3% more likely to report an increase in storage costs. This implies that awareness of the suspension may heighten firms' perception of cost increases or could reflect the actual impact of the suspension on firms' operations. Awareness might lead to heightened sensitivity to cost changes or could be indicative of greater operational adjustments needed due to the suspension.

However, the perception of the impact of the suspension on grading costs differs from that on storage costs for firms that are aware of the suspension and participate in the commodity derivative market. Firms participating in futures trading are 19.3% more likely to report an increase in grading costs, suggesting that these firms might experience higher costs associated with grading activities post-suspension. In contrast, firms aware of the suspension are 36.1% less likely to report an increase in grading costs. **This discrepancy may reflect varying strategies or operational adjustments related to grading activities following the suspension**, with aware firms potentially finding ways to mitigate grading cost increases or perceiving these costs differently compared to firms engaged in futures trading.

Regarding the perception of the impact of the suspension on transportation costs, participation in the commodity market does not significantly influence how firms perceive transportation costs. However, firms that are aware of the suspension are 23.2% less likely to perceive an increase in transportation costs, suggesting that awareness might be associated with better management or adjustments to mitigate these costs. Conversely, firms engaged in long-term contracts with suppliers and customers are 21.1% more likely to report a rise in transportation costs post-suspension. This increase could reflect additional logistical challenges or cost burdens associated with maintaining long-term contracts in the absence of futures contracts for risk management.

The registration status of the firm does not influence the perception of changes in storage, grading, or transportation costs following the suspension. Overall, the results indicate that while participation in the futures market provides some mitigation against increased storage costs and influences grading costs.

Table 3.8 Perceived impact of suspension on Operations cost (Marginal effects)

Dependent Variable: Increase in cost	Storage cost	Grading cost	Transportation cost
Commodity market participation (Yes=1)	-0.286**	0.193*	0.133
	(-0.13)	(-0.1)	(-0.08)
Registered firm (Yes or No)	-0.085	0.133	0.08
	(-0.15)	(-0.16)	(-0.11)
Suspension awareness (Yes=1)	0.413**	0.361**	-0.232**
	(*)	(*)	
	(-0.14)	(-0.14)	(-0.11)
Risk management (Long term contract with suppliers and customers (Yes=1)	0.066	0.034	0.211*
	(-0.13)	(-0.13)	(-0.12)
Risk management (Forward contract (Yes=1)	0.052	0.096	-0.159
	(-0.13)	(-0.11)	(-0.11)
N	69	69	69

Note: Robust standard errors are in parentheses, * p<0.1, ** p<0.05, *** p<0.01

Table 3.9-3.10 present the findings from the ordered probit analysis regarding the perceived **impact of the suspension of futures contracts on stable prices and risk management strategies**. Table 3.9 reveals that firms participating in the commodity derivatives market are 20.3% more likely to perceive a significant negative impact on stable prices.

In contrast, registered firms are 41.7% less likely to report a significant negative impact but are 14.7% more likely to report a marginal negative impact. Additionally, firms that engage in long-term contracts with suppliers and customers are 27.5% more likely to perceive a significant negative impact on stable prices. These firms are also 16.4% less likely to report a marginal negative impact compared to firms that do not use long-term contracts. On the other hand, firms utilizing forward contracts do not show a significant difference in their perception of the impact on stable prices compared to those that do not use forward contracts. **Overall, the results suggest that firms involved in commodity derivatives markets and those using long-term contracts with suppliers and customers perceive a significantly negative impact on their ability to maintain stable prices due to the suspension of futures contracts.**

Table 3.9 Ordered probit results (Marginal effects) of stable prices

Dependent Variable: Perceived impact on stable prices	No impact	Marginal negative impact	Moderate negative impact	Significant negative impact
Commodity market participation (Yes=1)	-0.059	-0.137*	-0.007	0.203*
Registered firm (Yes or No)	0.043	0.147**	0.226	-0.417**
Risk management (Long term contract with suppliers and customers (Yes=1)	-0.068	-0.164*	-0.044	0.275**
Risk management (Forward contract (Yes=1)	0.065	0.141	-0.012	-0.194
N	69	69	69	69

Note: Robust standard errors are in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The suspension of futures contracts also affects firms' risk management strategies. Firms participating in the commodity derivatives market do not show a significant difference in their perceived impact on risk management strategies compared to those that do not participate. However, the impact on registered firms is more nuanced. Registered firms report a 34.3% lower likelihood of perceiving a significant negative impact. Conversely, they are 8.3% more likely to

report no impact and 15.2% more likely to report a marginal negative impact compared to non-registered firms (Table 3.10).

Firms that use long-term contracts with suppliers and customers are 52.7% more likely to perceive a significant negative impact on their risk management strategies. In contrast, firms using forward contracts do not exhibit a significant difference in their perceived impact on risk management strategies compared to those not using forward contracts (Table 3.10). Overall, the results suggest that **firms employing long-term contracts with suppliers and customers perceive a significantly negative impact on their risk management strategies due to the suspension of futures contracts. In contrast, registered firms report a more marginal impact of the suspension on their risk management strategies.**

Table 3.10 Ordered probit results (Marginal effects) of risk management strategies

Dependent Variable: Perceived impact on risk management	No impact	Marginal negative impact	Moderate negative impact	Significant negative impact
Commodity market participation (Yes=1)	0.064	0.087	0.038	-0.189
Registered firm (Yes or No)	0.083* *	0.152*	0.108	-0.343*
Risk management (Long term contract with suppliers and customers (Yes=1)	- 0.197* *	-0.229***	-0.101*	0.527***
Risk management (Forward contract (Yes=1)	-0.049	-0.07	-0.032	0.152
N	69	69	69	69

Note: Robust standard errors are in parentheses, * p<0.1, ** p<0.05, ***

p<0.01

The suspension of futures contracts also affects perceived financial stability. **Firms that participated in the ETCs trading are 35.9% more likely to report a significant negative impact on their financial stability compared to those that did not participate.** Registered firms are 24.1% more likely to report a marginal negative impact and 38.5% more likely to report a moderate negative impact, while they are 62.6% less likely to report a significant negative impact compared to non-registered firms (Table 3.11).

Firms using long-term contracts with suppliers and customers are 20.3% less likely to perceive a marginal negative impact but 30.8% more likely to perceive a significant negative impact on their financial stability. In contrast, firms using forward contracts do not show a significant difference in their perceived impact on financial stability compared to those not using forward contracts. Overall, the results indicate that **firms involved in commodity derivatives markets and those using long-term contracts with suppliers and customers perceive a significant negative impact on their financial stability due to the suspension of futures contracts.** In contrast, registered firms report a more varied impact, with a tendency to experience less severe effects on their financial stability.

Table 3.11 Ordered probit results (Marginal Effects) of Financial Stability

Dependent Variable: Perceived impact on financial stability	No impact	Marginal negative impact	Moderate negative impact	Significant negative impact
Commodity market participation (Yes=1)		-0.266**	-0.093	0.359**
Registered firm (Yes or No)		0.241***	0.385**	-0.626***
Risk management (Long term contract with suppliers and customers (Yes=1)		-0.203**	-0.105	0.308**
Risk management (Forward contract (Yes=1)		0.081	0.033	-0.113
N	69	69	69	69

Note: Robust standard errors are in parentheses, * p<0.1, ** p<0.05, ***

p<0.01

3.4 Qualitative Insights from Interactions with Physical Market Participants

Most of the physical market participants we interacted with by way of in-depth interviews were of the opinion that the introduction of ETCDs was founded on the grounds that trading enables informational efficiency and leads to efficient price discovery for the market participants. In particular, there was an agreement that spot markets are expected to use futures prices as benchmarks and its importance for risk management, particularly price risk hedging. However, physical market participants acknowledged that despite the advantages of ETCDs and the benefits that they offer, there was a consensus that regulatory risk as the suspension in 2021 is a significant concern.

Many physical market participants suggested that it is necessary to disentangle the effect of international commodity prices influencing domestic prices from any effect that futures trading may be associated with. Our interactions with several agribusiness conglomerates with international exposure to commodity price volatility unequivocally articulated that the role of international factors and trade rules in influencing India's edible oil prices is more critical than ETCD trading. Most emphasized that domestic edible oil prices are sensitive to international commodity dynamics because more than half of the country's edible oil demand is met through imports and it should be borne in mind that India is the largest importer of edible oils in the world.

In what follows, to present some key ideas that emerged from the in-depth interviews, we showcase the perspectives of four market physical market participants whose rich perspectives offer a nuanced understanding of the impact of the suspension of ETCDs.²³ Upon the request of market participants and as mentioned in the methodology section 3.2, we anonymized them and used generic pseudonyms like MARKET PARTICIPANT A, B, C, and D. We present the findings across some thematic areas as follows:

²³ We conducted around 30 in-depth interviews of market participants spanning interests in all the suspended commodities and having different core business activities. For the sake of brevity, we showcase four market participants with core interest in soybean and its derivatives.

3.4.1 Roles and Activities of the Firm

MARKET PARTICIPANT A engages in the development and promotion of soy-based products while MARKET PARTICIPANT B is a soybean processor. MARKET PARTICIPANT B sources soybeans from local traders and farmers and actively participates in the ETCD trading. MARKET PARTICIPANT C engages in multiple activities, including importing and selling edible oils in the local market, trading commodities domestically and internationally, and providing consultancy to large importers. MARKET PARTICIPANT D is an integrated player in the edible oil business with a presence across the entire value chain, from farm to fork. It owns multiple manufacturing units and has considerable refining capacity of, seed crushing capacity, and packaging capacity.

3.4.2 Views on the Suspension

MARKET PARTICIPANT A **holds differing views on the suspension of futures trading depending on the commodity.** MARKET PARTICIPANT A supports the suspension of soybean ETCDs, citing the small size of the domestic Indian soybean market, which accounts for only 2-3% of the global market (around 100 lakh tons). Due to this limited market size and the suspension on soybean imports in India, MARKET PARTICIPANT A believes there is a high probability of price manipulation through speculation. MARKET PARTICIPANT A notes that the volatility in soybean futures prices has created significant challenges in price discovery for finished refined soy oil, leading to stability and sustainability issues for processors. **However, MARKET PARTICIPANT A advocates for lifting the suspension on futures trading for refined soy oil, arguing that it operates in a global market where it can be freely imported and exported, thereby reducing the potential for price manipulation and speculation.**

MARKET PARTICIPANT B expressed significant concerns about the suspension. **The suspension has hindered their ability to manage price risk independently, resulting in increased handling costs, including storage, transportation, and interest.** This has adversely affected the firm's financial stability, though it has not impeded its access to fair and stable prices or credit. Additionally, MARKET PARTICIPANT B **observed implications for the feed sector**

as the poultry industry is experiencing difficulties with soy feed availability and prices, which is attributed to the suspension of ETCDs

MARKET PARTICIPANT C views the **suspension as an uninformed decision, arguing that domestic market speculations contribute only marginally to inflation compared to major global events such as the Russia-Ukraine war, COVID-19, and climate change.** MARKET PARTICIPANT C is of the opinion that **the impact of the suspension varies significantly among stakeholders: while large players continue to thrive in global markets, small processors and farmers are adversely affected.** Furthermore, MARKET PARTICIPANT C believes that **the suspension has restricted small and medium processors' ability to hedge against price risks, and misinformation from some processors about production levels has further disrupted price stability.** Additionally, MARKET PARTICIPANT C noted that the **range of price volatility has remained similar before and after the suspension, with no observed influence of futures trading on price volatility.**

Adding to MARKET PARTICIPANT C's perspective, MARKET PARTICIPANT D emphasized that the suspension has little to no impact on large players, as they have alternative tools for risk management. However, MARKET PARTICIPANT D believes that the suspension is **directly and indirectly harming farmers, who are struggling with price discovery and not receiving fair prices.** MARKET PARTICIPANT D argued that the **reintroduction of futures trading would help ensure that farmers get fair prices for their produce.** MARKET PARTICIPANT D argued that overall, the suspension has had varying effects on large and small firms as well as farmers. Large firms have reported no change in operational management costs post-suspension, as they utilize alternative risk management strategies such as global futures trading, forward trades, and buying commitments from farmers. In contrast, small and medium processors face increased operational costs due to the suspension, as they lack access to these alternative risk management tools and struggle with higher costs in managing price risks.

3.4.3 Price Discovery Mechanism Post-Suspension

MARKET PARTICIPANT B reported that suspension has affected the firm's ability to independently manage price risk, **thus complicating price discovery and market access for hedging**. Currently, the firm is relying on local sources, online platforms, and their personal networks for price information.

Both MARKET PARTICIPANT C and MARKET PARTICIPANT D trade in international commodity markets like Malaysia (BMD), Chicago (CBOT), and European exchange, which provide essential price information and aid in risk management by allowing the firms to benchmark prices against global standards. **This access to international markets not only helps them navigate the volatility of domestic markets but also enables them to hedge against potential risks**, ensuring more stable operations despite the suspension of futures trading in India.

3.4.4 Commodity Price Volatility

According to MARKET PARTICIPANT A, the rise in global prices for palm oil (CPO) due to its diversion for biodiesel is a key factor in price volatility. MARKET PARTICIPANT A argued that for **soybean and sunflower oils, spot price volatility is influenced by import tariffs and global market conditions**. MARKET PARTICIPANT A noted that high volatility in soybean spot prices has led to stability issues for processors.

MARKET PARTICIPANT B argued that **futures trading does not drive inflation; instead, global market conditions, like China's stockpiling during COVID-19, were the main causes of surge in soy oil price**. MARKET PARTICIPANT C and MARKET PARTICIPANT D both identified **geopolitical events, climate change, and weather disruptions as key drivers of commodity price volatility**. While MARKET PARTICIPANT C believes that speculation can affect prices and suggested improved delivery mechanisms in futures contracts as a solution, MARKET PARTICIPANT D disagreed, viewing geopolitical and global factors as the primary causes and questioning the effectiveness of futures contracts in reducing speculative impacts.

3.4.5 Risk Management Strategies Post-Suspension

All the four Market Participants had a consensus that most of the large firms are hedging in global markets and forward trades, and rely on buying commitments to manage price risk effectively. However, small and medium-sized firms rely on traditional risk management strategies.

3.4.6 Recommendations of the Market Participants

MARKET PARTICIPANT A recommended **lifting the suspension on futures trading to enhance market liquidity and stability**, emphasizing that futures markets provide crucial risk management tools and a safety net for hedgers. However, there was caution advised regarding the lifting of the suspension on soybean futures due to concerns about speculation and its impact on market stability. MARKET PARTICIPANT A also advocated for futures in soy meal (DOC). Furthermore, MARKET PARTICIPANT A added that, in the 2022-23 marketing season, import tariffs were lower, and it is expected to continue to be so till the end of March 2025. Therefore, if imports grow due to lower tariff structure, it is widely felt by that it will adversely impact processors because the domestic price of mustard and soybean and their end products will fall as the trend over the past six months has been. This concern of manufacturers and processors also indicates that while lower prices are deemed beneficial for consumers, the manufacturers and processors are not better off with price decline; thereby highlighting a **balancing act that the government has to take into consideration**.

MARKET PARTICIPANT B emphasizes the need to **lift the suspension, highlighting that small and marginal firms are disadvantaged because they cannot afford the high margins in global markets, unlike larger players who continue to trade in global futures markets**. He advocates for allowing futures trading in soybean oil, arguing that the large global market for this commodity makes it less susceptible to speculation and manipulation.

MARKET PARTICIPANT C and MARKET PARTICIPANT D advocate for the **reinstatement of futures trading for soy oil, arguing that the large global market for soy oil minimizes the impact of speculation**. They highlight that while the leading exchange NCDEX has sufficient liquidity for some commodities, it lacks liquidity for refined soy oil. They recommend increasing liquidity at domestic exchanges to better support futures trading.

3.5 Insights from Interactions with Farmer Organizations

3.5.1 Insights from In-depth Interviews of FPOs and CBBOs

In our in-depth interviews, we interacted with around 30 farmer organizations, out of which we have validated data of 22 organizations representing various farmer organization which included 14 Farmer Producer Organizations (FPOs) and 8 from Cluster-Based Business Organizations (CBBOs). These respondents were geographically dispersed across three states, with two participants from Madhya Pradesh, seven from Rajasthan, and 13, from Maharashtra. The diversity of their operations was evident in the range of commodities they managed (Table 3.12): 5 organizations were involved in the handling of mustard, 9 managed wheat, 9 dealt with Chana, 7 focused on soybean, and one organization specialized in refined soy oil. Most of them engage in produce marketing, processing, and storage, while few extend their operations to input supply and extension services. Only 5 of the 22 organizations traded in the futures market.

Table 3.12 Major Business Activities of FPOs/CBBOs

Major Business	Number of FPOs/CBBOs
Produce marketing	14
Input supply	7
Facilitating credit	2
Processing	11
Storage	10
Extension services	6
Contract farming	0
Futures trading	5
N	22

We also inquired about the respondents' understanding of price volatility and the strategies they employ to manage price risk. **The feedback revealed that climate factors and demand-supply dynamics are widely perceived as the primary drivers of price volatility.** Additionally, respondents noted that the accumulation of stocks from previous years also contributes to price fluctuations. To mitigate these risks, most respondents rely on strategies such as collective marketing, crop insurance, stock holding, and futures contracts. A few have also shifted to contract farming, while others emphasize the effective use of warehouse storage facilities to better manage price risks.

We examined the perceived benefits of participating in the futures market and assessed the impact of its suspension on price discovery mechanisms and the overall well-being of FPOs. Additionally, we explored the adaptive strategies that FPOs adopted in response to the suspension. Among the 22 respondents, only 3 indicated that they used futures primarily for hedging, while one respondent used futures contracts for obtaining price information and achieving better price realization.

When questioned about the effects of the futures suspension on financial stability, market access, credit availability, and the ability to secure fair prices, 8 respondents reported significant negative impacts on these areas, including their financial stability, market access, participation, and ability to secure fair prices. Moreover, 2 respondents noted that their risk management strategies were significantly disrupted, and 6 reported moderate impacts due to the suspension (Table 3.13). In the absence of hedging options post-suspension, FPOs have faced considerable challenges in managing risk. To sustain their operations, many FPOs have turned to brokerage-based commodity selling and the sale of agricultural inputs as alternative strategies.

Table 3.13 Impact of futures suspension on FPOs/CBBOs

	Significantl y	Moderatel y	Slightl y	No impac t
Financial stability impacted	8			
Ability to secure fair prices impacted	8			
Market access and participation disrupted	8			
FPO's ability to access credit and financial resources impacted	6	2		
Risk management practices altered	2	6		

APMCs and local markets are the most commonly relied-upon sources for price discovery, with 11 FPOs using these channels for price information. Additionally, 10 FPOs use newspapers as a key source of price discovery. Personal networks also play a role, with 3 FPOs depending on them for price information. In contrast, digital sources like online platforms and social media (e.g., WhatsApp) are underutilized, with only one FPO each using these tools. This trend suggests that, in the absence of futures contracts, FPOs largely rely on established offline channels to gather pricing information, potentially limiting their access to timely and diverse market insights.

3.5.2 Qualitative Insights from FPOs and CBBOs Interactions

In this section, qualitative insights from interactions with representatives of FPOs and CBBOs are presented. FPOs are groups of farmers that primarily focus on aggregating produce from individual farmers, which enables better price negotiations and achieves economies of scale. They are also involved in processing and adding value to products, enhancing their quality and marketability. Additionally, FPOs help farmers obtain quality inputs at reduced costs through bulk purchasing and often provide or facilitate access to credit, insurance, and other financial services. They offer essential training and capacity building in modern farming techniques, crop management, and financial literacy. In contrast, CBBOs are professional entities that concentrate on the formation and growth of FPOs.

Most farmers we interacted with during fieldwork as well as the FPOs and CBBOs rely on local markets and auction systems to determine the prices of their crops. The comfort and familiarity farmers have with traditional markets. They sell their produce directly to local traders. Information about current prices is often sourced from local newspapers and word-of-mouth. While these newspapers provide updates on current prices and market conditions, they do not offer insights into futures prices.

Before the suspension, few FPOs and CBBOs used to hedge the risk in the commodity derivative market while most of them engaged in traditional hedging methods involving storing grains until market prices rose; it also carries the risk of spoilage and storage costs. However, traditional methods often leave farmers vulnerable to sudden price drops, leading to financial instability.

These organizations have limited understanding and awareness of commodity derivative markets, and only a handful of FPOs participated in the commodity derivative market before the suspension. However, they recognize the potential of these tools for price discovery and hedging. They argued that futures trading could provide a safety net by enabling farmers to secure prices for their crops in advance, thus ensuring a more predictable income stream.

Among the farmers and farmer associations we interviewed, several stakeholders expressed skepticism about commodity derivatives and futures trading. They cited a lack of awareness and understanding among farmers as a significant barrier. The stand-out suggestions were that government initiatives, such as seminars and workshops, are essential to educate farmers on how these financial instruments work and their potential benefits in price discovery and risk management. Few representatives stressed the need for accessible training programs to help farmers grasp these concepts.

Finally, an FPO leader proposed exploring cooperative models for engaging in futures trading. They suggested that FPOs could pool resources and collectively participate in the futures market, thereby reducing individual risk and increasing bargaining power. This cooperative approach could also facilitate shared learning and support, making it easier for farmers to navigate the complexities of futures trading.

These insights emphasize the need for significant efforts to equip farmers with the knowledge and resources required to effectively utilize these financial instruments. The findings highlight the importance of education, awareness, and support in facilitating the transition to commodity derivatives and futures trading. It is worth noting that the FPOs we interacted with were those who were regular hedgers on the platform and have highlighted their concerns on several platforms. While most of the concerns that the FPOs have raised pertains to lack of awareness for the non-participating FPOs, for those with experience of hedging at an exchange, there are concerns that are range from.

3.6 Conclusion

Based on the surveys and interactions with different stakeholders including physical market participants and processors associations among others in the commodity value chain across Maharashtra, Madhya Pradesh, and Rajasthan, the following facts are evident.

First, **ETCDs undoubtedly play an important role in price discovery in the commodity markets.** Following the suspension of futures trading, actors have found it difficult to arrive at an alternative mechanism for price discovery. **While the large agribusinesses have relied on alternative sources of information and market intelligences, traders, processors, exporters and FPOs have struggled to find an efficient substitute.** For stakeholders who have not participated in agricultural commodity derivatives trading, the abrupt suspension of commodity futures trading has an indirect effect of subduing their trust in futures markets and is likely to depress the demand for reliance on futures for price discovery as well as risk hedging.

Second, **apart from a few contrarian views, there is no overwhelming perception among physical market participants that spot price volatility of the suspended commodities has reduced compared to the pre suspension period.** It needs to be noted that the volatility is specific to the time period of reference and sweeping generalizations are neither desirable nor prudent.

Chapter 4 Summary of Findings and Policy Suggestions

4.1 Introduction

In the context of the suspension of seven exchange traded commodity derivatives contracts (ETCDs) by SEBI in December 2021 that is in force till December 2024, it is of utmost importance to conduct a comprehensive study of the impact of the suspension on the agri ecosystem in India. With the main objective of examining several aspects of the suspension on the agri ecosystem, we undertook a study that uses primary and secondary data to answer key questions pertaining to the suspension.

The study relied on time series analysis of secondary data comprising daily time series on futures prices, spot prices, and retail prices for the select commodities. Primary data were collected through survey of physical market participants in three states namely Maharashtra, Rajasthan, and Madhya Pradesh by focusing on the following state-commodity focus:

- i. Mustard seed (Rajasthan)
- ii. Refined Soy oil (MP)
- iii. Soybean (MP and Maharashtra)
- iv. Chana (MP, Maharashtra, Rajasthan)
- v. Wheat (MP and Rajasthan).

Beyond the survey, in-depth interviews of over several stakeholders were conducted between June-July 2024.

The rest of the chapter is organized as follows. Section 4.2 presents the summary of main findings from the secondary data analysis and primary data analysis undertaken in this study. Section 4.3 presents our policy suggestions for consideration of policy makers.

4.2 Main Findings

4.2.1 Findings from Secondary Data Analysis

1. In case of retail prices of the suspended commodities, we do not find a decline in prices of these commodities even after suspension. Rather, retail prices remained high for most of the suspended commodities as well as that of the unsuspended commodities in the period after the suspension. This suggests that the price rise phenomenon for the commodities under study is unrelated to futures market.
2. There is a marked decline in trading volume for commodity futures that were suspended intermittently and relisted in the past without the suspension having a dent on commodity volumes and prices. This suggests that commodities exchanges lose the momentum on developing liquidity for contracts on these commodities.
3. There is a general increase in volatility of spot prices and retail prices after suspension. This indicates that if the suspension had positively impacted the volatility, then we would expect lower volatility in the post-suspension period for the commodity spot prices but the results suggest the suspension has not stabilized the spot and retail prices.
4. Our comparison of the pre-suspension volatility of the individual contracts with the post-suspension period volatility using DID technique suggests that there is no statistically significant difference in the volatility of suspended commodities with that of peer group post suspension.
 - a. Most specifically, for soy oil though there is no effect in volatility of the peer group for 3 months and 6 months after suspension, there is increased volatility 12 months post suspension.
 - b. We also observe that for soy oil, volatility has increased for domestic peer group post suspension indicating that the suspension has not stabilized the domestic markets.
5. Speculation ratio (ratio of open interest to volume traded) for none of the commodities are Granger causing spot price except refined soy oil. This finding contests the view that high speculative trading in the futures market leads to higher spot prices.
6. We do not find a causal relationship running from traded volume to spot prices for mustard, soybean, soybean oil and chana, indicating no destabilizing effect of futures trading and spot prices in the pre-suspension period.
7. Spot prices and futures price series are I(1) (cointegrated). This essentially means that both spot and futures price series are in the long-run equilibrium relationship with each other. We find bidirectional Granger causality between spot prices and futures prices for all the five

suspended commodities. This essentially means that spot prices are discovering futures price and futures prices are discovering spot prices and information flow might be broken impairing price discovery upon suspension on futures trading

8. Peer group analysis suggests international soy oil prices are cointegrated with domestic soy oil prices. This means that there is a long run equilibrium relationship between the two prices. Granger causality test further suggest that international soy oil prices Granger causes domestic soy oil prices. This suggest that price signals are generated by international markets and domestic soy oil markets are small and illiquid enough to discover prices.

The lack of evidence on the transmission of price volatility from futures market to spot market for the commodities of interest suggests that there is no price destabilization of the spot market due to futures trading. Therefore, distrust on the futures market from the perspective of speculative activities leading to distortion of spot prices is misplaced.

4.2.2 Findings from Primary Data Analysis

The main findings from our primary survey, in-depth field interviews, and field work suggests the following.

First, **ETCDs play an important role in price discovery in the commodity markets** who displayed significant variation in awareness about the ETCDs. Following the suspension of futures trading, physical market participants have in general found it discover prices in the spot markets. Second, **large agribusinesses have relied on alternative sources of information and market intelligences, traders, processors, exporters and FPOs have struggled to find an efficient substitute**. Third, **small holders and cooperatives remain uninsured bearing the brunt of price risk in the absence of commodity derivative contracts on exchanges**.

In addition to that for stakeholders who have not participated in agricultural commodity derivatives trading, the **abrupt suspension of commodity futures trading has an indirect effect of subduing their trust in futures markets** and is likely to depress the demand for reliance on futures for price discovery as well as risk hedging.

In-depth interactions with stakeholders in the commodity value chain across three states suggest that **there is no overwhelming perception among physical market participants that spot price volatility of the suspended commodities has reduced compared to the pre**

suspension period. It needs to be noted that the volatility is specific to the time period of reference and sweeping generalizations are neither desirable nor prudent.

Furthermore, the insights from FPO representatives underscore the importance of education, awareness, and support in transitioning to commodity derivatives and futures trading. While there is recognition of the potential benefits in price discovery and hedging, significant efforts are needed to equip farmers with the knowledge and tools to effectively utilize these financial instruments.

1. Extension Services

Extension services can play a critical role in this transition by providing hands-on training and continuous support to farmers. These services can bridge the knowledge gap by offering customized advice and solutions, ensuring that farmers are not left to navigate these complex systems alone.

2. Gender Perspective

Incorporating a gender perspective is essential to ensure that both male and female farmers benefit equally from these initiatives. Tailored training programs that address the specific needs and challenges faced by women farmers can promote inclusive growth and empower all members of the farming community.

3. Education and Outreach

From an educational standpoint, incorporating topics on commodity derivatives and futures trading into agricultural curricula can prepare the next generation of farmers to better understand and utilize these tools. Additionally, leveraging digital platforms and local media to disseminate information can reach a broader audience, making the benefits of futures trading more accessible.

4. Building a Supportive Ecosystem

Government initiatives, community-led training, and cooperative models could play pivotal roles in this transformation, ultimately leading to more stable and profitable farming practices. By fostering an ecosystem that supports learning, collaboration, and innovation, institutions for risk mitigation can significantly enhance the resilience and sustainability of the agricultural sector.

5. Engaging with Local Trading Networks

Farmers often have conversations with traders, local farming groups, and others involved in the supply chain, such as those who own transportation for crop produce. Peer farming groups and community discussions in the village *choupal* play a crucial role in shaping farmers' decisions. Integrating these networks into the education and support framework can ensure that the transition to futures trading is grounded in the farmers' existing knowledge and practices. Engaging these local networks will also help in disseminating information and creating a supportive environment for adopting new financial instruments. Interaction with CBBO's also offered interesting insights. We present insights from a CBBO interaction in Annexure B.

4.3 Policy Suggestions

1. In light of the importance of futures markets in providing efficient price discovery and risk hedging opportunities to market participants, it is evident that **suspension of ETCD trading did not result in addressing food inflation.** In the lack of statistical evidence on futures trading causing retail inflation as shown in Chapter 2, **we strongly recommend the lifting the suspension on ETCD trading.**
2. Since physical market participants emphasize the importance of liquidity as a crucial factor for greater participation in the futures market, and given the that it takes time for newly launched contracts to stabilize and gain currency (Chapter 2), **abrupt suspension of ETCDs affects the prospects of relying upon futures market for price discovery as well as risk hedging for all the actors in the commodity value chain are problematic for development of the agri ecosystem (Chapter 3). Such discontinuation also affects integration of spots and futures markets, therefore warranting an immediate removal of the suspension.**
3. Regulatory risks such as ad hoc suspension which we have found to affect trust and confidence of the commodity market participants are counterproductive. **Therefore, there is a need for adopting a consultative approach should be followed to decide policy interventions.**
4. It is important to note that **all commodities should not be treated alike**, and the **relative sensitivity of the domestic retail prices to international factors (for those traded**

internationally), global geopolitics, weather anomalies, supply chain disruptions, and substantive changes in the availability and outlook for substitutes and complementary commodities as elaborated in Chapter 2 should be seriously evaluated by the government and research community.

5. For **refined soy oil** and **mustard oil** in particular, the movements of international prices need to be monitored carefully given the high reliance on imports to meet domestic demand. Recent import restrictions on soyabean coupled with no import and export regulations on refined soy oil could lead to no change/ little change in status quo. Inflationary pressures on edible oils have indeed been a major policy concern, and **there is a need for careful analysis of the effect of international price movements and trade patterns which we indicated in Chapter 2, is warranted.**
6. **For commodities for which domestic Mission Support plans have been implemented by the Government of India such as the National Oilseeds Mission, futures trading will help the prices to be discovered domestically** rather than the price signals to be emanating from international markets only. This allows market participants to increasingly rely on domestic price signals for their decision making rather than on international price signals.
7. For **grains whose prices are inherently linked to the MSP and government's procurement policies (Chapter 2), strategies need to take into account the seasonal demand forecasts and support mechanisms that promote transport warehousing and stocking.**
8. Given the importance of commodity futures trading for development of innovative agricultural financing alternatives such as warehouse financing (Chapter 3) and strengthening of instruments such as NWR and eNWR as well as the policy thrust on integration of spot and future markets, suspension on ETCDs **adversely impacts the objectives of the government in introducing impactful agricultural market reforms.**
9. Our study suggests that while exchanges have put in efforts to improve farmer and FPO participation, a major barrier to higher participation is awareness about futures markets and availability of contracts that are suitable for farmers are unable to aggregate at the level and grade of produce that standardized ETCDs demand (Chapter 3). We believe that **the government should take necessary steps in addressing these critical issues.**

Government should put in efforts to train and bring awareness among farmers, FPOs, and cooperatives.

4.4 Limitations

While the study attempts to understand perspectives of physical market participants for specific commodities in three states and presents a broad range of participants as described in Chapter 3, it need not be considered representative of all segments of the physical market participants.

For the study, we have relied on a sample of participants that could not be randomly sampled due to non-availability of sampling frame comprising list of market participants. Despite curating lists of participants across several cities and towns in the three states, low response rate resulted in lower than anticipated sample size for our econometric analysis.

For the secondary data analysis in Chapter 2, there is no objective measure of what comprises the peers for commodities in both domestic and international markets and we have relied on literature as well as conventional wisdom to categorize commodities as peers. Therefore, the findings need not be extended to other commodities.

While Difference-in-Difference (DID) technique offers credible causal insights on the effect of the commodity suspension, for data series where the parallel trends assumption is invalid, DID results should be interpreted with caution. Even in the extant literature, recent studies that offer insights on DID do not report the results of the parallel trends assumption, and there was no response to our attempts at seeking clarifications on the same. Alternative techniques such as synthetic control function for specific commodities have also been employed to estimate effects of the ETCD trading suspension but there are econometric concerns in such studies as well that are beyond the scope of this report.

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