Impact of Suspension of Commodity Derivatives on the Agri Ecosystem

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Chapter 1 Introduction

1.1 Introduction

Agricultural commodity futures were introduced with the goal of enabling participants in the commodity value chains efficient price discovery and price risk management. The rationale behind trading agricultural commodity derivatives (forward/futures contracts) emerged from the needs of farmers and traders, which dates back to the evolution of derivatives trading that began with agricultural commodities (Weber,2009). It grew out of the farmers' desire to manage the price risks of their accumulated volumes of grain inventories (Till 2014). Therefore the primary motive of introduction of agriculture derivatives was to help farmers in understanding the market value of their produce and manage price risk of their crop. However, in countries like India, despite significant investment in the infrastructure of enabling futures trading, agricultural derivatives have been seen with suspicion time and again, thereby creating considerable uncertainty among futures market participants. It has been argued that speculation in agriculture derivatives results in disconnecting food prices from its fundamentals and it is not benefitting the farming community (Kabra, 2007).

It is evident that despite a late start in India, commodity derivatives trading has been treated with suspicion and political economic factors have resulted in recurrent government interventions (Gulati *et al*. 2017). While some have argued that it is not serving the purpose of price discovery and risk hedging as intended, others have argued that it has not benefited farmers at all and favors the speculators. It has also been argued that it has distorted the food prices and fuelled food price inflation. However, studies have found mixed results on futures' impact on spot prices. Therefore, there is a need for more comprehensive and robust empirical studies with accurate methodology to understand futures-spot

relationships. In order to understand how efficient price discovery has been in India, we need more studies on this issue.

In a bid to rein in inflation, in December 2021, the Securities and Exchange Board of India (SEBI) prohibited exchanges from launching new commodity futures contracts (CFCs) for seven commodities namely mustard seed, soybean and its derivatives, chana (chickpea), wheat, crude palm oil, moong and non-basmati paddy. Launch of new contracts in chana were banned in August 2021, as a precautionary measure against food inflation. Whilst this was not for the first time CFCs were banned in India, the prolonged suspension that saw extension of ban till December 2024, raises several concerns about how it has impacted the agriculture ecosystem ('agri ecosystem' for short throughout the report).

The primary reason for the recent suspension and prolonging the period of suspension are concerns about food inflation that had been difficult to rein in. Moreover, a scan of the reports about the suspension also suggest that there is an underlying assumption that speculative trading volume plays a role in sustained increase in the spot prices of the traded commodities. Given the significance of commodity futures trading in the agri ecosystem, this study attempts to find answers to the following three questions.

- Did the suspension of commodity futures trading of specific commodities attain its goal of curbing food inflation?
- Is speculative trading indeed a concern in food inflation?
- How did the suspension impact stakeholders in the commodity value chain (physical market participants and non-participants including the farming community)?

To find answers to these questions, this study examines both secondary data of daily price series of futures, spot, and retail price 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 and multiple commodities.

1.3 Study Objectives

The objectives of the study are as follows.

- To examine the effect of the suspension of five commodity futures contracts (CFCs henceforth) 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 suspected commodities is a matter of concern.

- 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 holistic 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 data on futures prices, spot prices, and retail prices to examine whether the suspension of five commodities of focus (excluding moong and non-Basmati paddy) has been effective in controlling retail inflation. The details of the analysis are presented in Chapter 2.

Second, 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). The details of the surveys and interactions 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 evolution of the agricultural commodity derivatives markets in India and summarize the evidence on whether suspension of CFCs 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 synthesis of the findings and key policy recommendations.

1.5 Evolution of Agricultural Commodity Derivatives Market in India

India is one of the early adopters of derivative contracts. Organized commodity derivatives in India started in the nineteenth century when the Bombay Cotton Trade Association started futures trading in 1875 nearly a quarter century after the first such trading happened in the world at the Chicago Board of Trade. Since then it flourished under meek regulation with one or two instances of bans(Rose Mary K. Abraham,2020). After Independence, the Government of India enacted the Forward Contracts (Regulation) Act in 1952 to regulate the trading in forwards and futures and The Forward Markets Commission (FMC) was established in 1953 under the Ministry of Consumer Affairs (FMC was merged with the SEBI in 2015). However, frequent restrictions and suspensions by authorities resulted in low depth and poor liquidity in these markets. The first major boost to the development of the commodity derivatives market came in 2000 when the government announced liberalization of these markets under the 'National Agricultural Policy'(Aggarwal *et al*. 2023). Since 2003, commodity derivatives flourished enormously in India.

Commodity derivative trading happens through exchanges. At present, there are five national exchanges in India that trade agriculture commodity derivative contracts. These are: MCX, NCDEX, BSE, NSE, ICEX. Of these, the MCX has a dominant share in trading of non-agricultural commodities such as crude oil, gold and metals, while NCDEX has a dominant share in trading of agricultural commodities. These exchanges are regulated by SEBI (earlier it was FMC but it was merged into SEBI in 2015). It is widely believed that before the merger of FMC with SEBI, regulation of the derivative market was not strong.

Commodity futures markets were liberalized in 2000 to aid efficient price discovery and effective risk management, and electronic trading began in 2003. Since then commodity futures trade began its growth. Interestingly, while the commodity derivatives market has had its tryst with regulation, there has been a divergence in the trajectory of agricultural and non-agricultural commodity derivatives. 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 market in India is that commodities with relatively small market size have recorded high volumes of trading and vice versa (Kabra, 2007). 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 large spot market size saw low futures trading.

Volumes in the commodity market witnessed broadly three distinct phases of growth. The first phase, from 2002-03 to 2005-06, saw phenomenal growth of more than 200% per annum. The second phase (2006-07 to 2011-12) recorded a steady and robust annual average growth rate of about 44% per annum. In the third phase (2012-13 to 2014-15) volumes fell at an average rate of 28.5% per annum (Lingareddy, 2015). The important reasons for the precipitous fall were the levy of commodity transaction tax on future contracts and the Rs 5600 crore fraud case of National Spot Exchange Ltd in 2013 (Lingareddy, 2015).

However, despite the National Agricultural Policy 2000 that recommended development of active futures trading, commodity derivatives market in India continues to be subjected to frequent restrictions and commodity suspensions (Gulati *et al*, 2017). These restrictions usually take the form of imposition of additional margins and ultimately followed by suspension of the commodity from futures market trading (Aggarwal *et al*. 2023).

1.6 Agricultural Commodity Derivatives Trading and Inflation

There has been common concern amongst policymakers and academics that growing financialization and speculation in futures markets has distorted food prices (Cheng & Xiong, 2014). While several studies in the global context have examined the impact of financialization of commodity markets on food prices, the evidence is mixed and conflicting in the Indian context.

Kabra **(**2007) raised the point that though the primary aim of commodity derivatives is to help farmers in better risk management and price discovery, agricultural commodity futures markets in India have not served this aim because of institutional and structural barriers. The Khusro Committee (1980) pointed out barriers such as very few producers raising crops large enough to think in terms of hedging and illiteracy of farmers who are unfamiliar with the complicated technique

of hedging (Kabra, 2007). Consequently, it has been argued that the futures market mostly serves speculative interest. There are very few traders who participate with the real interest to take delivery. With limited, if any participation by the growers, and marginal presence of the hedgers (except some large entities), these prices are viewed as the handiwork of too much money playing around with relatively small quantities of the commodities referred to in nominal terms and price discovery gets blurred (Kabra 2007). Thus Kabra attributed the price rise of 2008 that was associated with suspension of several agricultural commodities to rampant speculation in commodity futures markets.

Ghosh *et al*. (2012) analyzed the impact of speculation on commodity futures markets and its impact on global food prices. They explored the relationship between futures market liquidity and price stability. They explored the relationship between movements of food prices in spot markets and futures markets as well. They took the open interest to measure the liquidity of futures markets and compared its time series with the time series of spot prices. They took the data on open interest for three futures markets at the Chicago Board of Trade (CBOT): wheat, maize and soybean from 1986 to 2011. They used the indices of global commodity prices for wheat, maize (corn) and soybeans for spot prices. They compared the open interest and spot prices and found that as open interest rose in 2004, price indices also went up. They found that highest levels of volatility were associated with the rapid increases in liquidity, and there was a strong correlation between the increase in liquidity in these commodities futures markets and the rapid rise of prices and volatility of prices in the spot market (Ghosh *et al*. ,2012)**.**

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; thus, implicitly focused on the paradigm of introducing futures trading. Singh (2000) investigated the Hessian cash (spot) price variability before and after the introduction of futures trading (1988-97). Results of a multiplicative dummy variable model indicated that the futures market reduced the price volatility in the Hessian cash market.

Yang *et al*. (2005) examined the lead-lag relationship between futures trading activity and cash price volatility for major agricultural commodities. Granger causality tests and generalized forecast error variance decomposition showed that an unexpected and unidirectional increase in futures trading volume causes an increase in cash price volatility. Further, they found a weak causal association

between open interest and cash price volatility. Sahi (2006) studied the impact of introducing agricultural commodity futures contracts on the volatility of the underlying commodities in India, concluding that the nature of volatility did not change with the introduction of futures trading in. wheat, turmeric, sugar, cotton, raw jute and soy oil. However, a weak destabilizing effect was found from futures to spot in the case of wheat and raw jute. Further, results of Granger causality tests indicated that the unexpected increase in futures activity in terms of increases in volumes and open interest led to an increase in cash price volatility in all commodities that were listed. The study confirmed the conception of the destabilizing effect of futures trading on agricultural commodity prices.

Nath and Lingareddy (2008) regressed the price of urad on prices of other grains and pulses. The inclusion of prices of foodgrain as well as all commodities in the regression was meant to understand the effect of a general price rise in food grains and other components of the wholesale price index (WPI). The price of urad was found 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 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. A corresponding but relatively slow increase in the prices of total 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.

1.8 Effect of Suspension of CFCs

In India, the agriculture derivatives market witnessed a number of instances of ban or suspension of CFCs. During the global financial crises, food prices went up and to tackle that the government banned future trading on eight commodity contracts in 2008. Similar actions by the government were seen in 2016 and 2021 in response to surge in food prices. It is believed that speculation in futures markets affects spot prices; so the government suspends agricultural commodity derivatives trading to tackle food inflation.

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 mustard seed futures trading activity on spot prices. They used data on spot prices from Agmarket and Ministry of Consumer Affairs and for derivatives data, they used data provided by NCDEX. They found no change in price trend even after the suspensions 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 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 bans could also have played a role in putting downward pressure on the prices.

In terms of volatility and 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 CFCs and that the futures suspension along with 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.

Day and Gairola (2024) used daily futures and spot price data of three suspended agricultural commodities of pre-ban sample periods, and found that chickpeas, soybean, and refined soy oil futures exhibited high speculative activity and enhanced liquidity while in the post-ban period, spot price volatility was found to be considerably higher for chickpeas 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 CFCs adversely affects price discovery and risk hedging.

1.5. 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 up-to-date analysis of daily price and volumes series that throws light on the effect of suspension of CFCs in India. Second, its coverage of commodities covers a larger number of suspended commodities relative to other recent studiesthat also attempted to examine the effect of suspension on several outcomes of interest through time series analysis techniques. Third, and perhaps most importantly, this is the only study that combines both primary and secondary data to answer the question of how suspension of CFCs 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 groups such as farmer producer organizations (FPOs) 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

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 (CFCs) for different categories of commodities, in this chapter, we present the results of our secondary data analysis and interpret the findings in the context of macroeconomic trends in commodity prices in both domestic and global markets.

We analyze rich data on daily futures and spot prices as well as volumes *for five of the seven suspended commodities*, *the exceptions being moong and non-basmati paddy*.[1] 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 ban on CFCs 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, wherein we estimate the causal effect of the suspension (treated as a natural experiment) by taking the difference in means of the suspended and a basket of unsuspended commodities at different points in time: before and after suspension. We have used 'suspension' and 'ban' interchangeably and unless otherwise stated, they retain the same meaning.

Our main findings are as follows:

1. In case of retail prices of the suspended commodities, we do not find a fall in retail prices 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

[1] The reason for exclusion of moong and non-Basmati paddy was the low liquidity of these CFCs in the exchange and a lesser immediate concern about the association of these two commodities with food inflation.

2. There is a marked decline in trading volume for commodity futures that were banned intermittently and relisted in the past, without the suspension having a dent on commodity prices.
3. Volatility of retail prices and spot prices have increased after suspension for all commodities except wheat and speculation ratio (ratio of volume traded and open interest) for none of the commodities are Granger causing spot price except refined soy oil.
4. 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. On the contrary, we find a causal relationship running from traded volume to spot prices for wheat and chana: two commodities whose future trading has been suspended in the past.[2]
5. We find bidirectional Granger causality between spot prices and futures prices for all the five suspended commodities.
6. Spot prices and futures prices series are I(1) (cointegrated).[3]
7. International prices of soy oil Granger causes domestic prices of soybean oil although these two series are not cointegrated.
8. Peer group analysis suggests that we have evidence to reject the null hypothesis that international soy oil prices do not Granger cause domestic
9. soy oil prices. However, we fail to reject the null hypothesis of lack of cointegration of the two series

[2] In the case of chana, traded volume Granger causes spot price for the period 2017 to 2021 while there is no Granger causality from traded volume to spot prices for period 2008 to 2016. Due to two suspensions instances, we analyzed Chana prices for two separate periods, first for the June 2016 suspension event and second for August 2021 suspension event.

[3] A stationary series is one whose statistical properties does not vary over time i.e it is a stochastic process whose joint probability distribution (unconditional) does not change over time. For instance, if a price series is stationary, the mean of a subset of the series does not differ significantly from the mean of any other subset of the same series. By contrast, a non-stationary series has a time varying mean. The order of integration of a series means the number of times the series must be differenced to produce a stationary series. Therefore, I(1) or integrated of order 1 implies that a stationary series is generated by first differencing the original series which was not level stationary. In this context, I(0) implies the series is stationary whereas I(2) implies second differencing resulted in stationarity. Two non-stationary series are co-inegreted if they are integrated with the same order and their linear combination is stationary.

10. The DID analysis indicates that the volatility of suspended commodities has not decreased significantly after suspension compared to their closest peer commodities that were not suspended.

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 specific indicators that help us estimate the effect of the CFC 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.

2.2 Data and Methods

Daily series for futures prices, polled spot prices, traded volume and open interest of commodities of interest were provided by NCDEX. Daily closing prices of 2-month ahead contracts were chosen owing to higher liquidity. For some commodities such as 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 is provided by NCDEX, they got it 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.

The main analysis of interest are as follows:

1. Relationship between trading volumes and spot prices for all commodities as well as retail prices for suspended commodities wherever applicable.
2. Comparison of volatility of suspended commodities before and after suspension
3. Relationship between futures prices and spot prices for suspended commodities
4. Relationship between domestic futures prices and international futures prices (for soybean oil)
5. Peer group analysis
6. Difference in Difference analysis on volatility

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 CFCs, we study the relationship of retail prices with their peers. We present the relationship between the variables by plotting them to observe any relative change in price trend after suspension. We have used time series tools like Granger causality test and cointegration to explore the long-run relationships between time series variables. In addition, based on our review of literature and fieldwork, and as we will elaborate in Chapter 3, we test the claims of several value chain participants (VCPs) that domestic price of soybean oil 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.

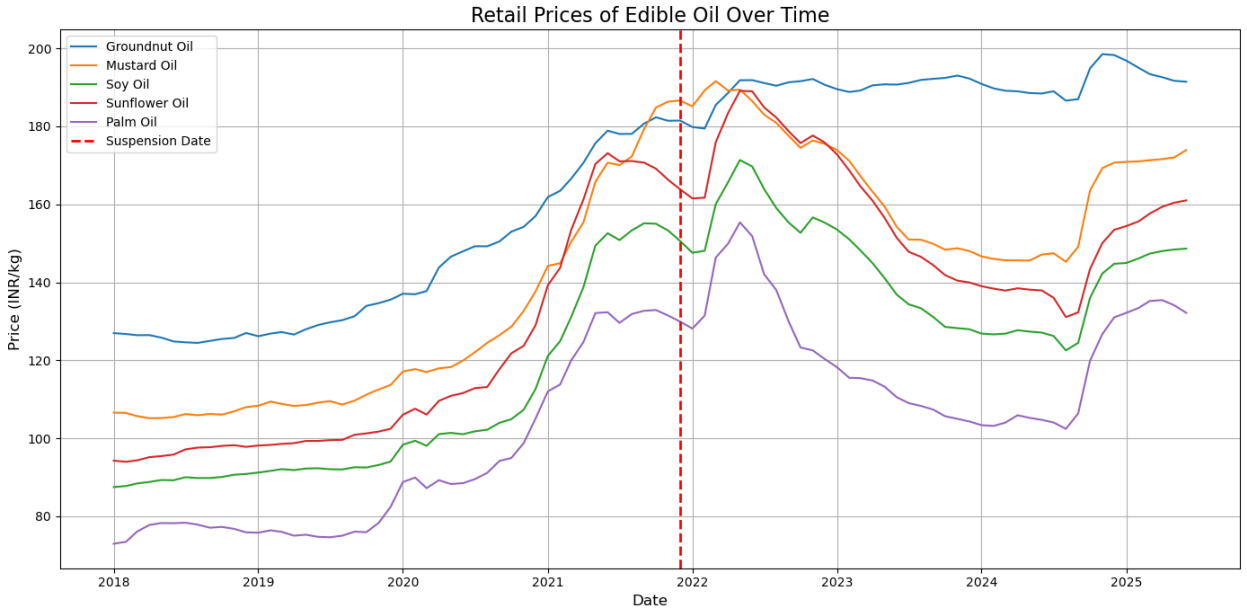
In what follows, we present the results of our analysis that help us assess the evidence crucial to evaluating the effect of the suspension of commodities on the agri ecosystem.

2.3 Results of Time Series Analysis

In this section, plots and statistical tests are presented for five suspended commodities: mustard oil, chana, wheat, soybean 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 CFC 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, groundnut oil, soy oil, and sunflower oil.[4]



Unit of y axis is Rs/ Kg

Fig 2.1 Trend of retail prices of mustard and peer oil groups: 2018-2025

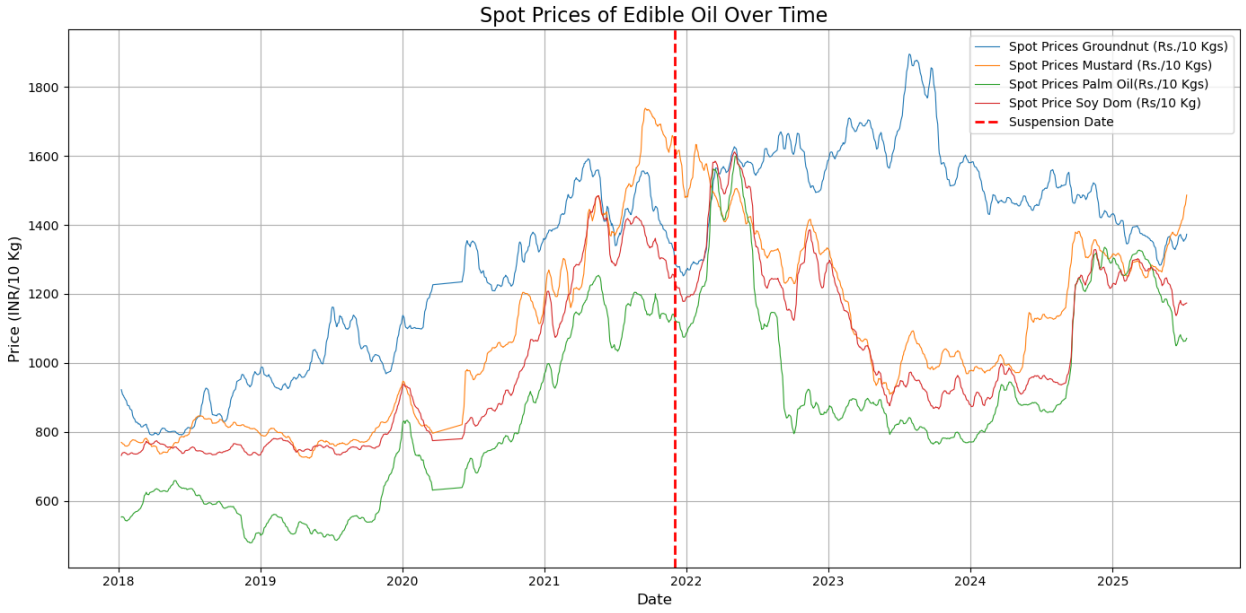
Note: The dashed vertical down shows the suspension of mustard oil futures trading in October 2021.

The mustard oil price that was already experiencing an uptick by the time RMSEED in December 2021, went up further even after the suspension of CFC until April 2022. Mustard prices started to decline from May 2022 along with that of all other edible oil. After the mid 2024 there has been subsequent rise in all prices of all the edible oils including mustard oil.

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

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.

If the claim that futures trading (CFC) causes retail inflation were true, then the prices of commodities not banned should not have fallen after October 2021. But since their prices did fall, it shows that other factors—not futures trading—are driving retail price changes, and our subsequent analysis will elaborate this further.



Unit of y axis is Rs/ 10 Kg

Fig 2.2 Trend in spot prices of mustard seed: 2004 to July 2025

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

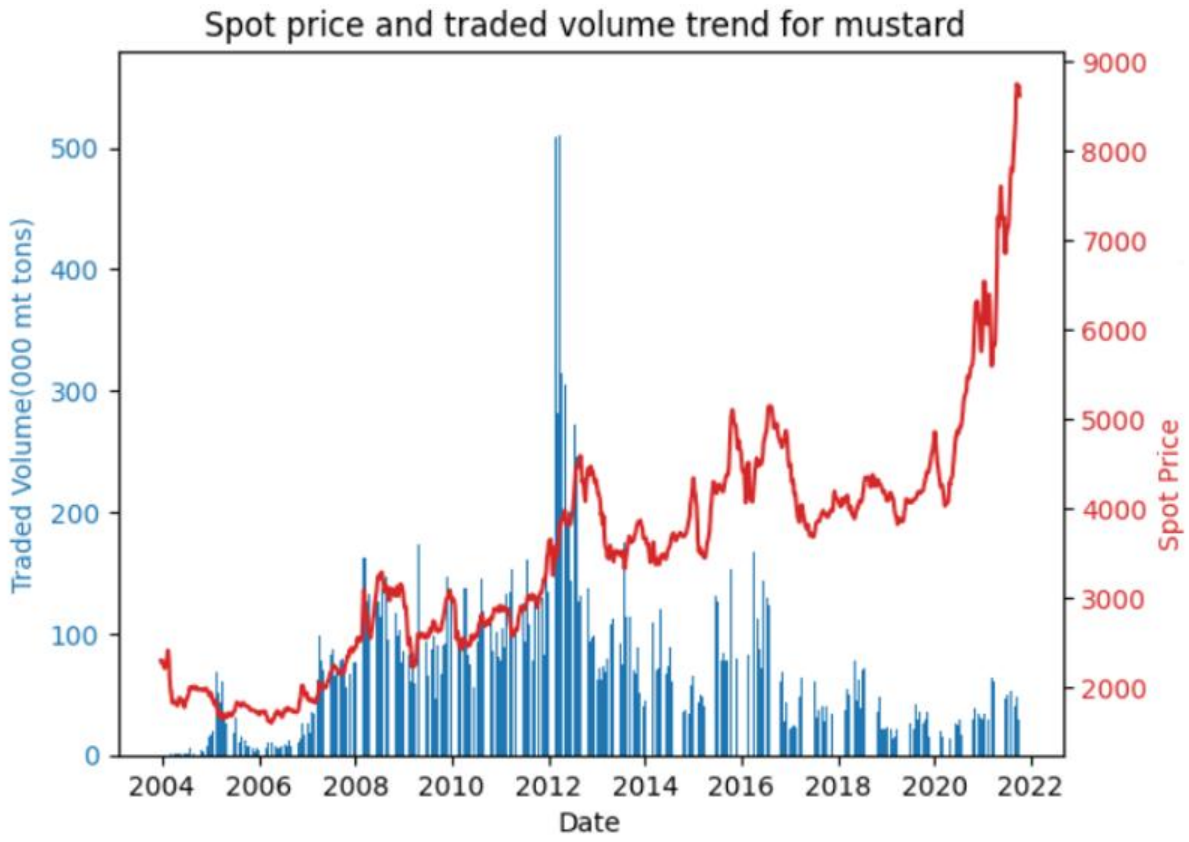
Source: Authors' analysis based on polled spot prices provided by NCDEX.

The relationship between [5]traded volume (RMSEED) and spot prices of mustard seed is plotted in Fig 2.3.[6] 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 RMSEED futures 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. *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.

[5] 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.

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



Unit of right y axis is Rs/Quintal

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. (interactive version of above plot see at https://plotly.com/~saras_sb/3/#/

Note: The primary Y-axis is traded volu;me of RMSEED whereas secondary Y-axis is spot price of mustard seed. 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

Null Hypothesis	**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:

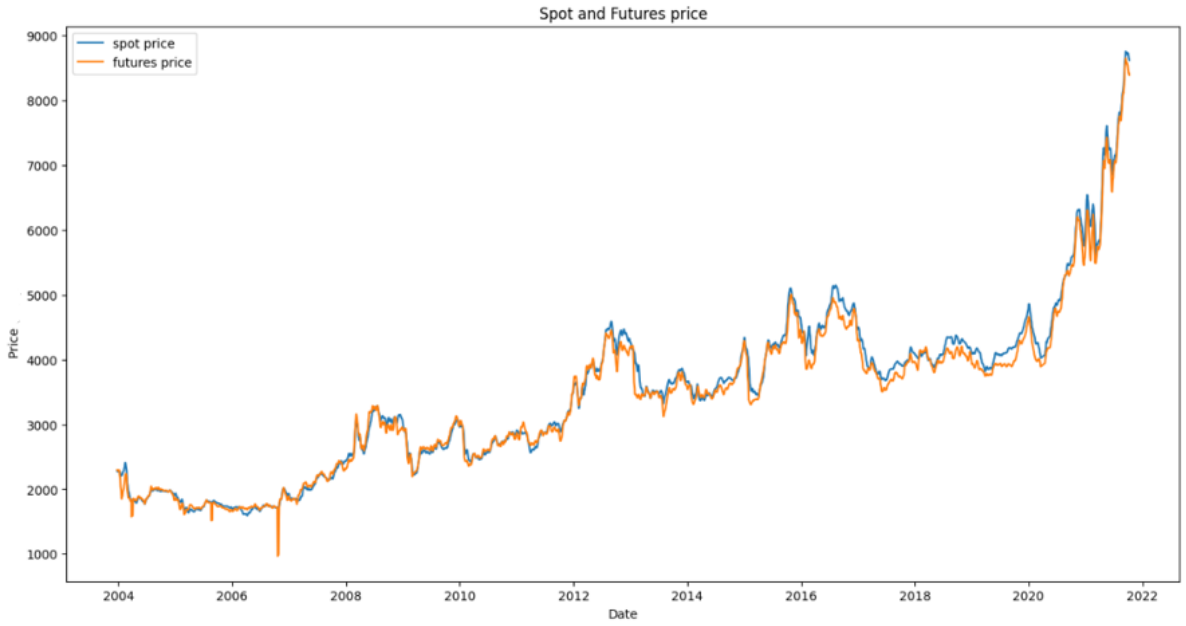
1. Granger causality test to determine whether past movements in one variable can help explain current movements in another one; if so, the latter variable is said to be caused by the former one.
2. For all causality tests in this paper, optimal lag order for causality test is 1, so judgements for results 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 spread and became grave while we can notice in fig 2.3 that traded volume of CFC of mustard in this period stayed low.



Unit of y axis is Rs/ Quintal

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

Now, 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.

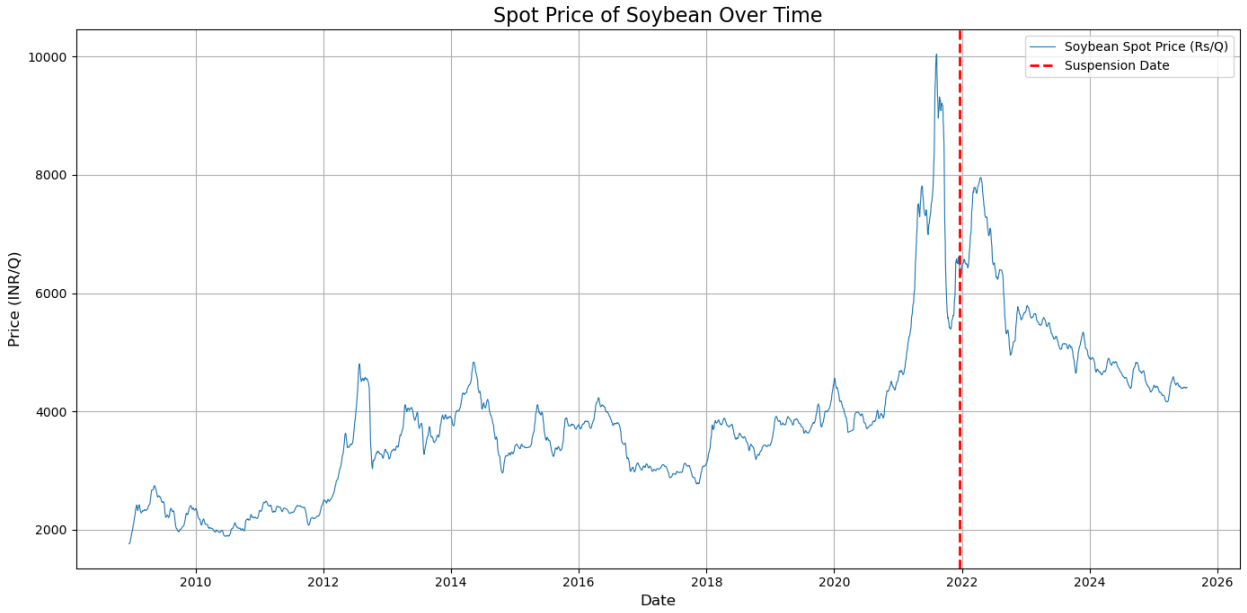
Table 2.2: Granger causality between mustard seed futures price and spot prices

Null Hypothesis	Lag Order	P-Value
Change in futures prices does not Granger causes change in spot prices	1	0.000
Change in futures prices does not Granger causes change in spot prices	2	0.000
Change in futures prices does not 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 price 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 only for the first time since its introduction on 20th December 2021.



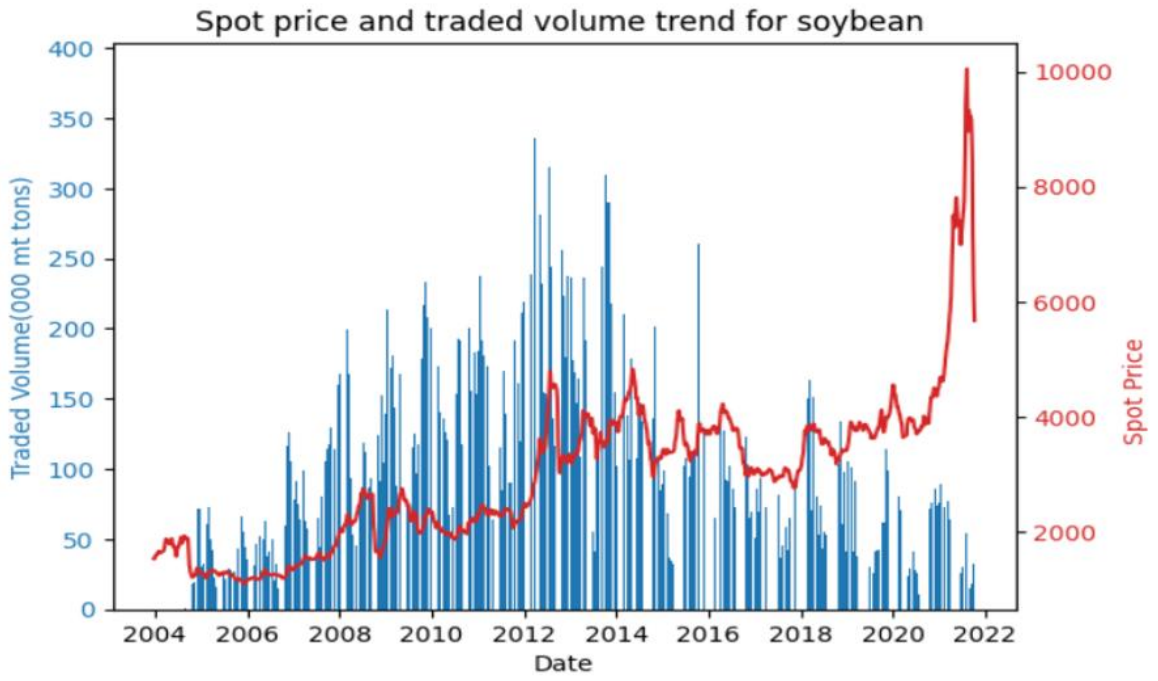
Unit of y axis is Rs/Quintal

Fig 2.5 Trend in spot price of soybean: 2004 to July 2025

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 and the prices remained high. Interestingly, before the suspension in 2021 prices had fallen sharply, and after the suspension, price surged for a few months. Thereafter, since mid-2022, soybean prices have 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.

Soybean prices remained subdued due to higher arrivals in May 2023 during the October 2022-September 2023 marketing seas 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.

Next, we show the spot price and trading volume relationship for soybean.



Unit of right y axis is Rs/Quintal

Fig 2.6 Spot prices and traded volume for soybean: 2004 to 2022
Interactive version of plot https://plotly.com/~saras__sb/26/

Table 2.3 Granger causality between soybean traded volume and spot prices

Null Hypothesis	**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 2.6.

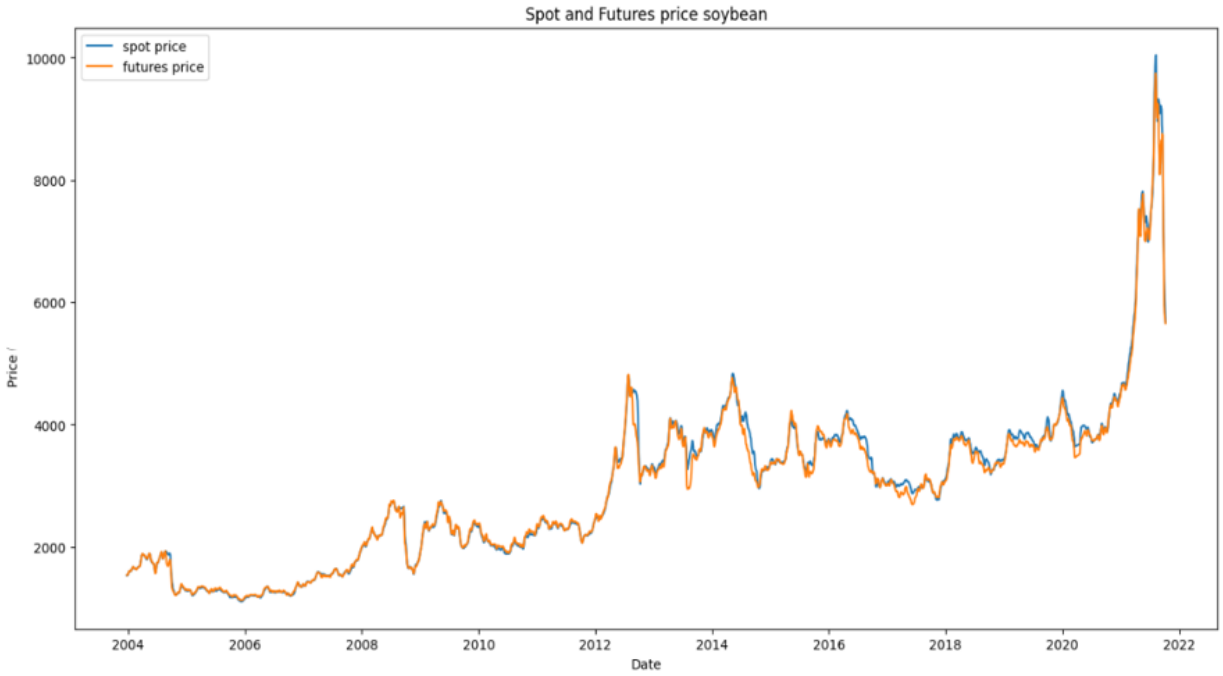


Fig 2.6 Spot and future price of soybean: 2004 to 2022

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. The same can be provided upon request.

Table 2.4 Granger causality between soybean futures price and spot prices

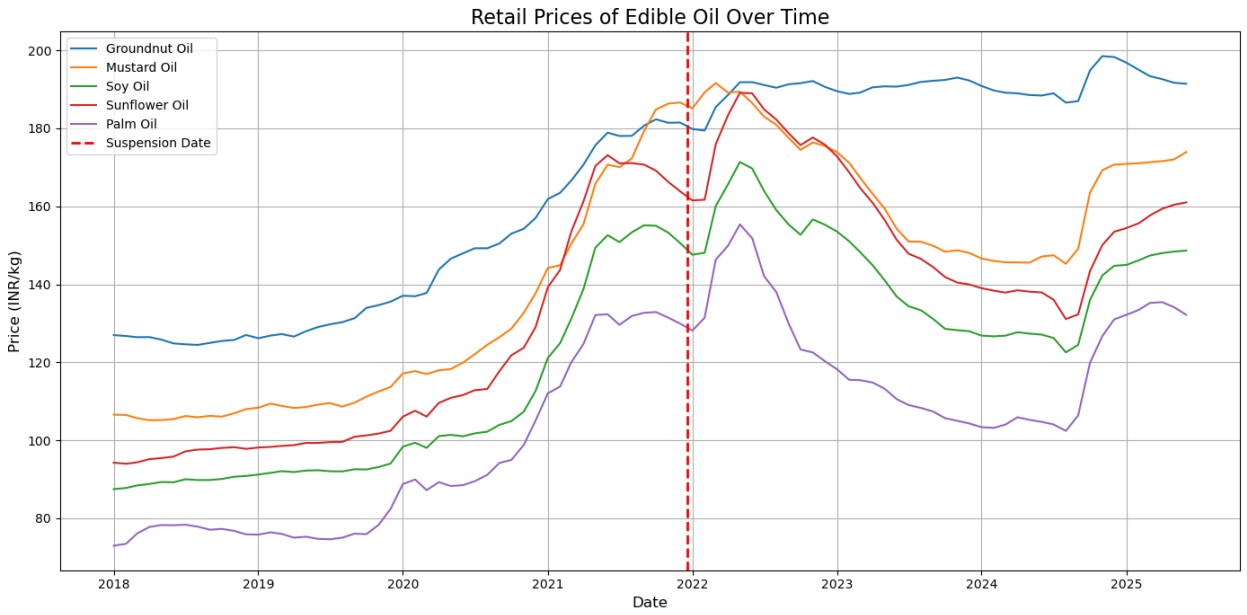
Null Hypothesis	Lag Order	P-Value

Change in futures prices does not Granger causes change in spot prices	1	0.000
Change in futures prices does not Granger causes change in spot prices	2	0.000
Change in futures prices does not Granger causes 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 occurred on 20th December 2021. As we examine if CFC 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, mustard oil, and sunflower oil.



Unit of y axis is Rs/ Kg

Fig 2.7 Retail prices of edible oils: 2018 to July 2025

Suspension of soy oil CFC did not help to curb the prices. It can be noticed that from February 2022, prices of all edible oils began to rise sharply and this is largely attribute to the Russia-Ukraine war that broke out on February 20, 2022.

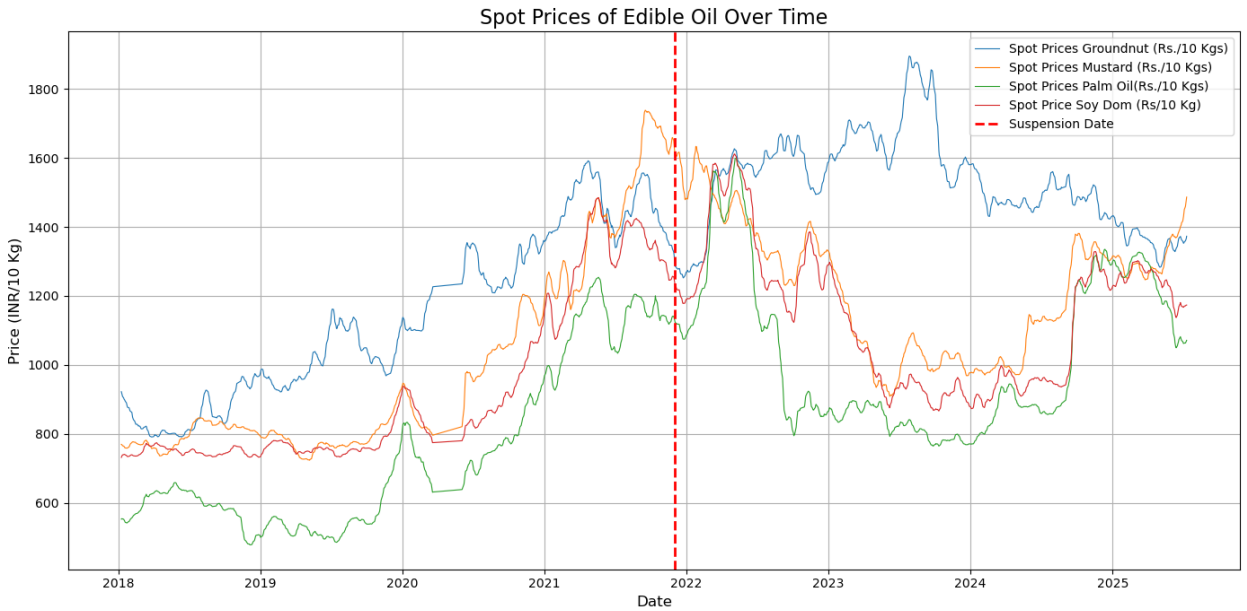


Fig 2.8 Spot price of soy oil: 2008 to July 2025

Data on spot prices and traded vol for soy oil has been taken since its relaunch after 2008 suspension. Soy oil prices rose unprecedentedly from Mar 2020 but declined in the 2023-24 season for reasons described earlier.

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.

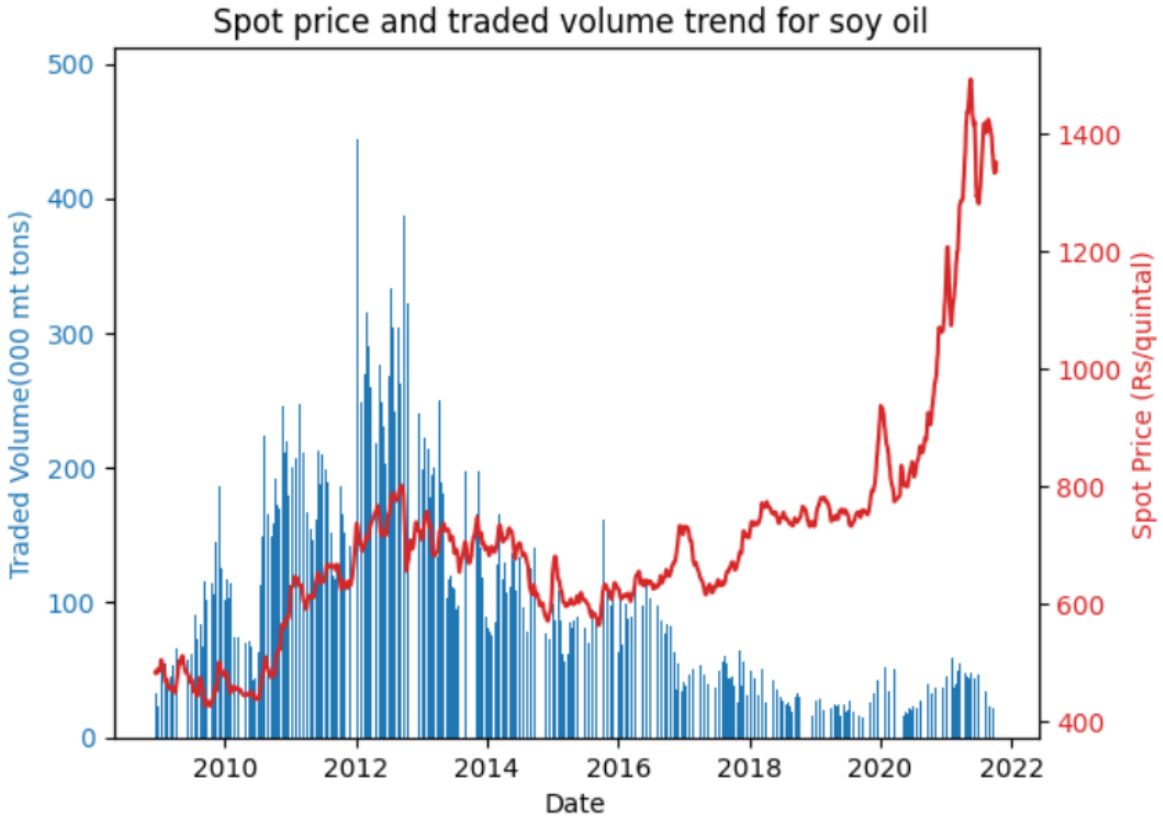


Fig 2.9 Spot price and trading volume for refined soy oil: 2008 to 2022 (See interactive version https://plotly.com/~saras__sb/20/)

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

Null Hypothesis	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. So 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.

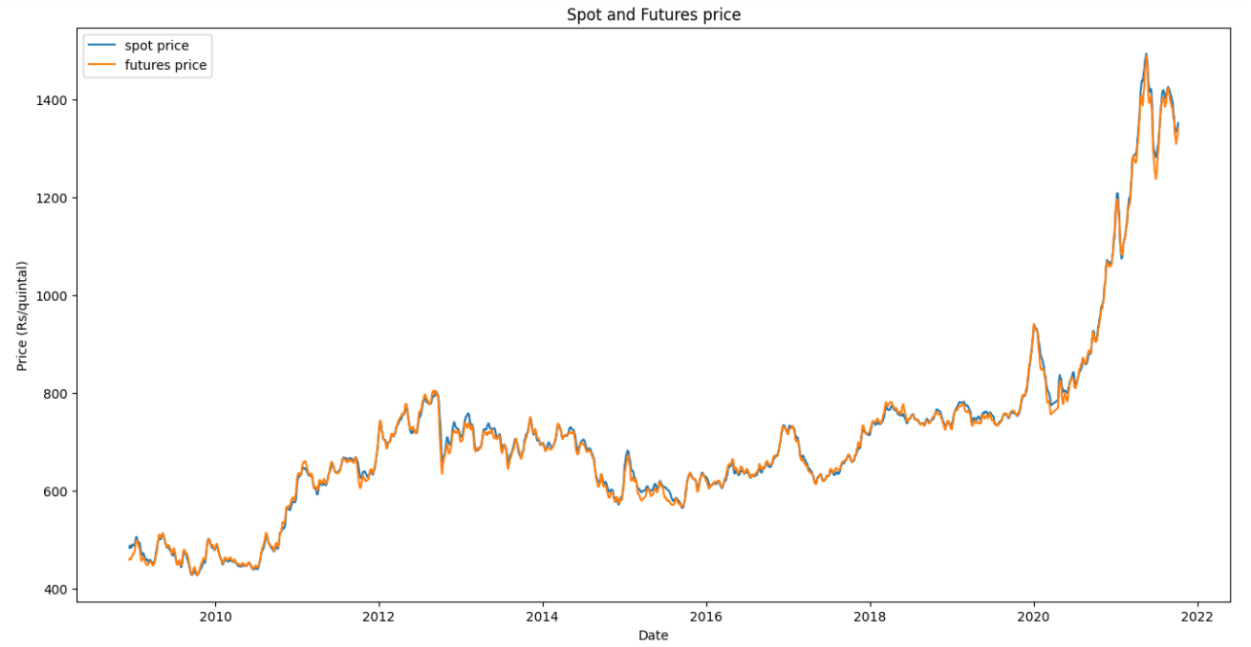


Fig 2.10 Spot and futures Price of Soy Oil: 2009 to 2022

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

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

Null Hypothesis	Lag Order	P-value
Change in futures prices does not Granger causes change in spot prices	1	0.000
Change in futures prices does not Granger causes change in spot prices	2	0.000
Change in futures prices does not Granger causes change in spot prices	3	0.000

It is evident from Table 2.6 that in the case of refined soy oil, futures price change Granger causes spot prices 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 CFCs 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 banned futures trading on chana. However this ban 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, we took the data from December 2008 to June 2016 and 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 CFC 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.

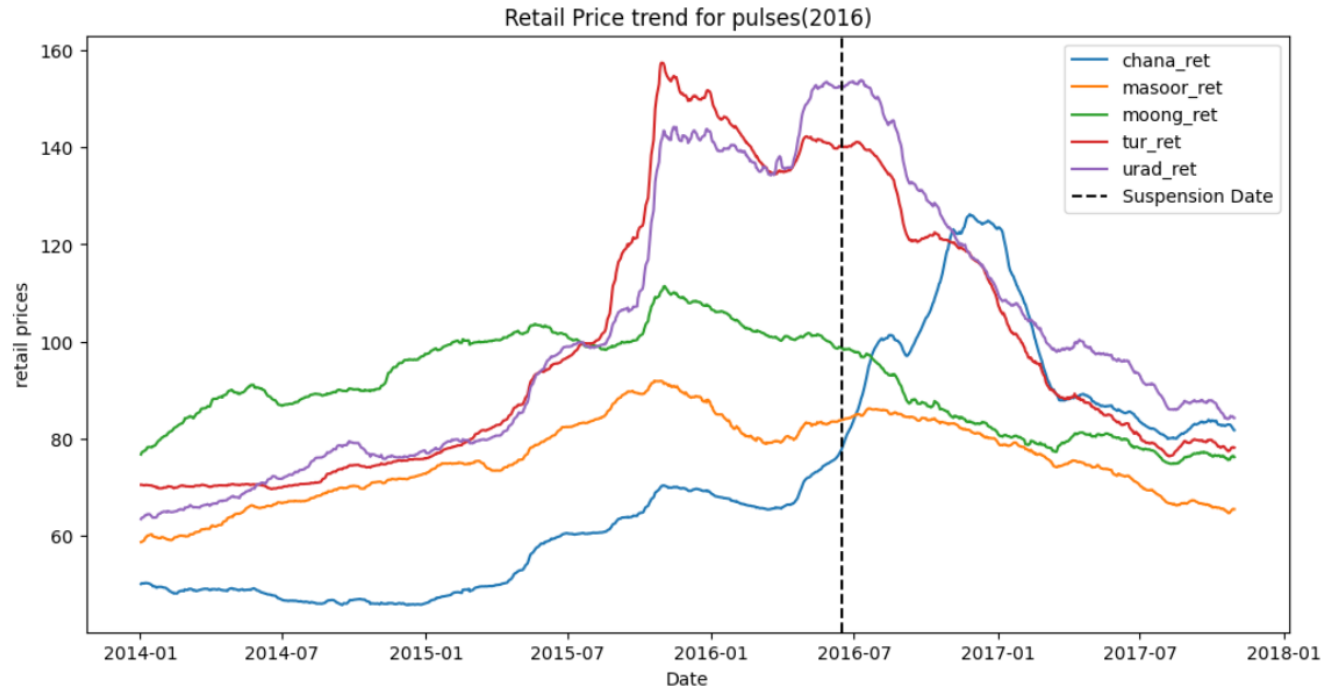


Fig 2.11 Retail price trend for pulses around suspension of June 2016: 2014 to 2018 From Fig 2.11, it can be noticed that after the suspension chana kept on rising for next six months and began declining from December 2016.

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. If suspension 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.

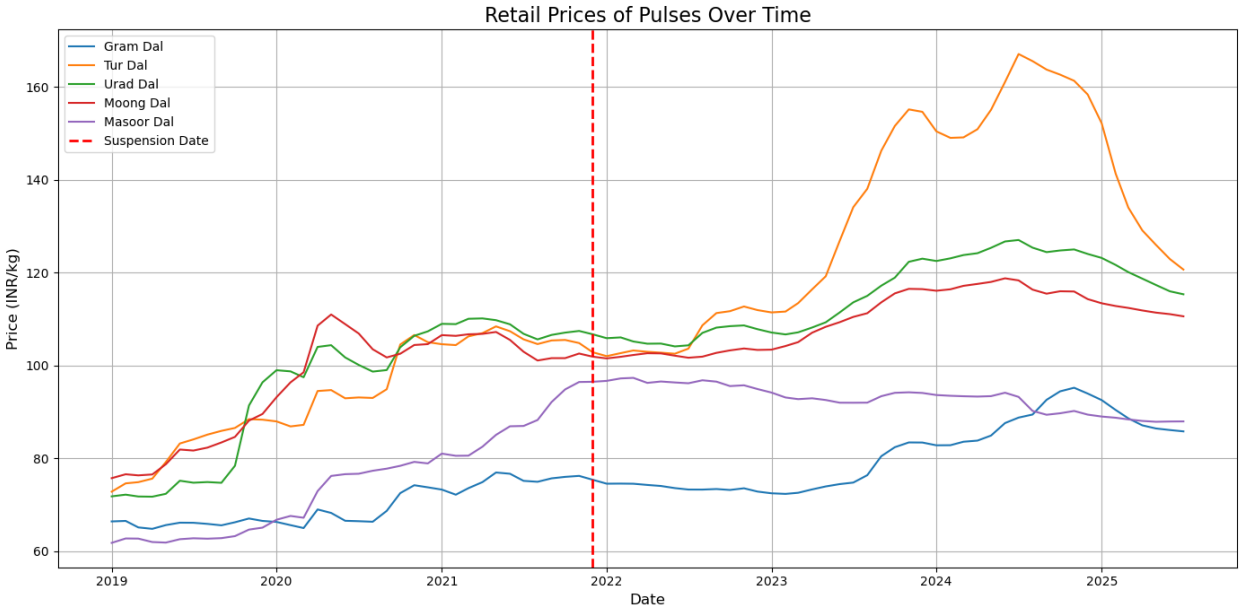
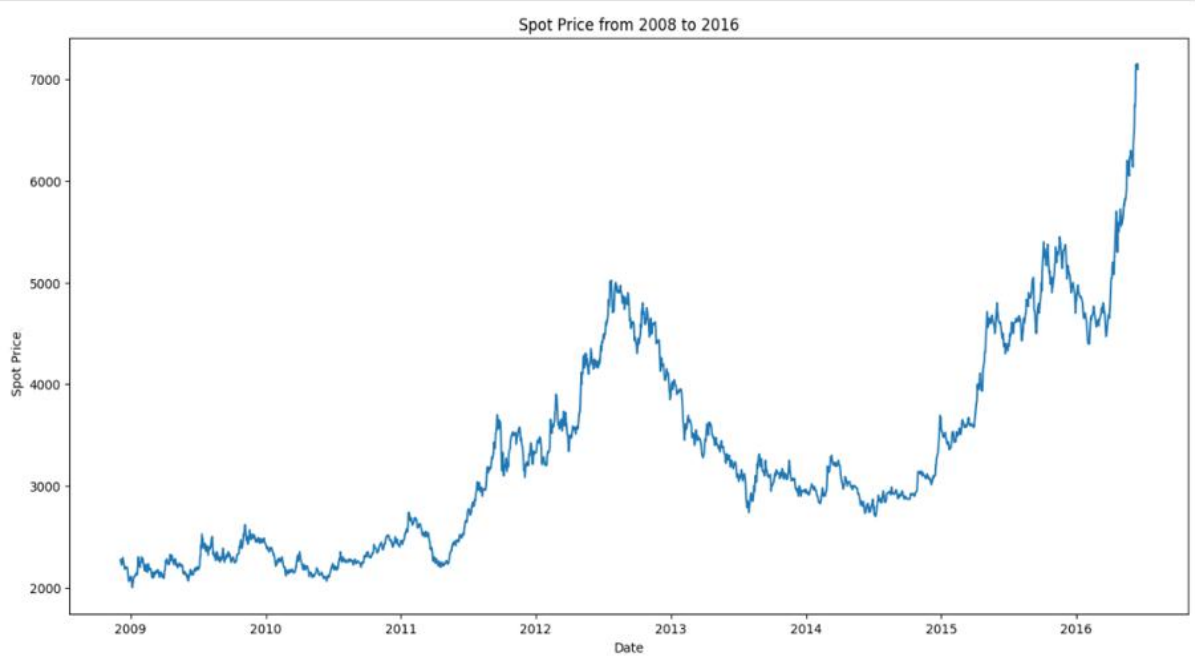


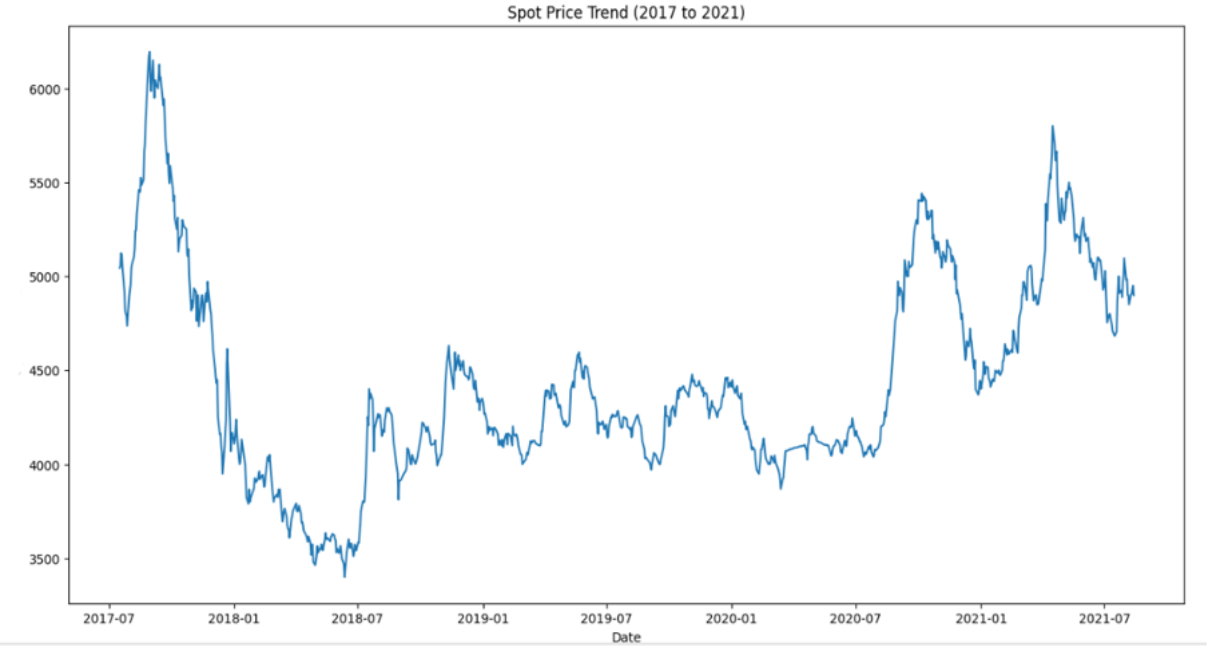
Fig 2.12 Retail price for pulses around suspension in August 2021: 2019 to July 2025 It is evident from Fig 2.12 that the price of all pulses of interest picked up with the imposition of lockdown and kept on rising further. Here chana prices stabilized after suspension while its price level remained higher than the pre-lockdown period. Over the same period, other pulses have also shown stable prices except tur.

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 Dec 2021.



Unit of Y axis is Rs/Quintal

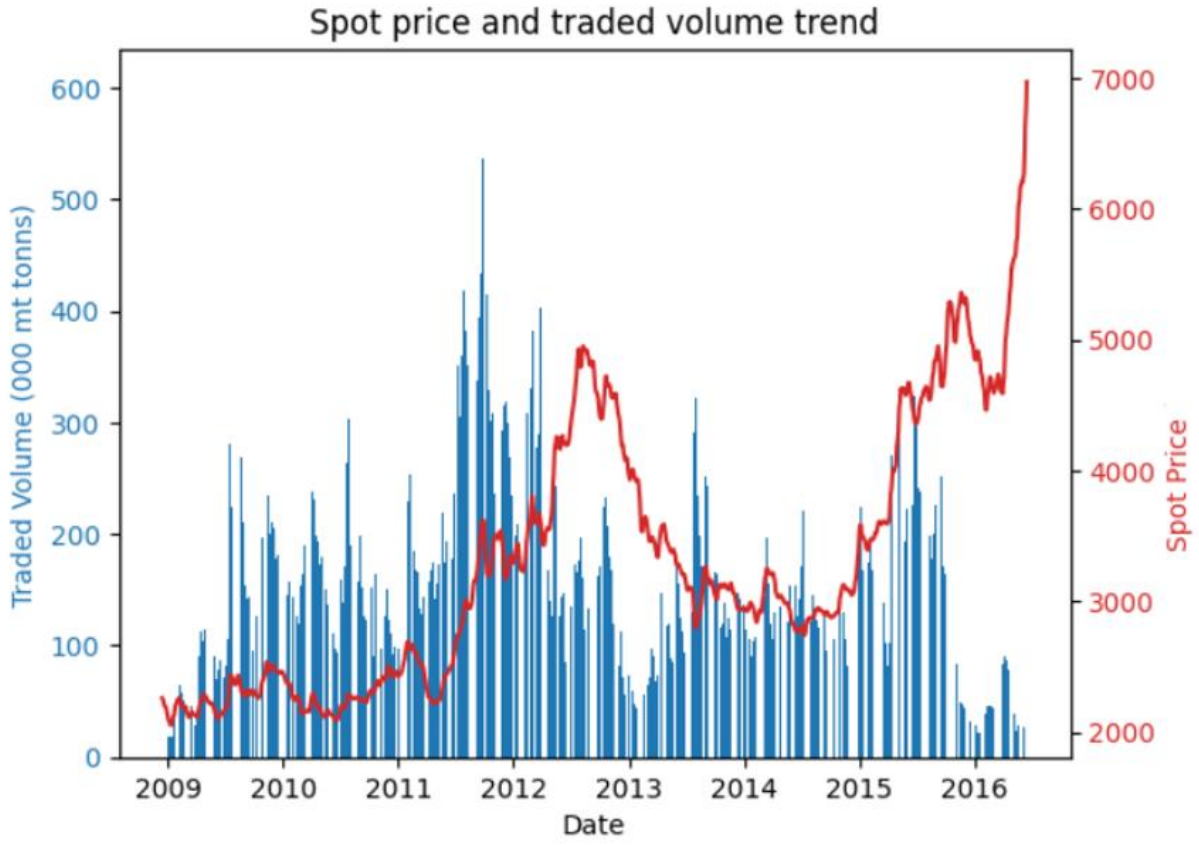
Fig 2.13a. Spot prices of chana: 2008 to 2016



Y axis represents Spot price (Rs/Quintal)

Fig 2.13b. Spot price of chana: 2017 to 2021

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



Unit of right y axis is Rs/Quintal

Fig 2.14(a): Spot price and traded volume for chana: 2008 to 2016
Interactive plot https://plotly.com/~saras__sb/14/

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.

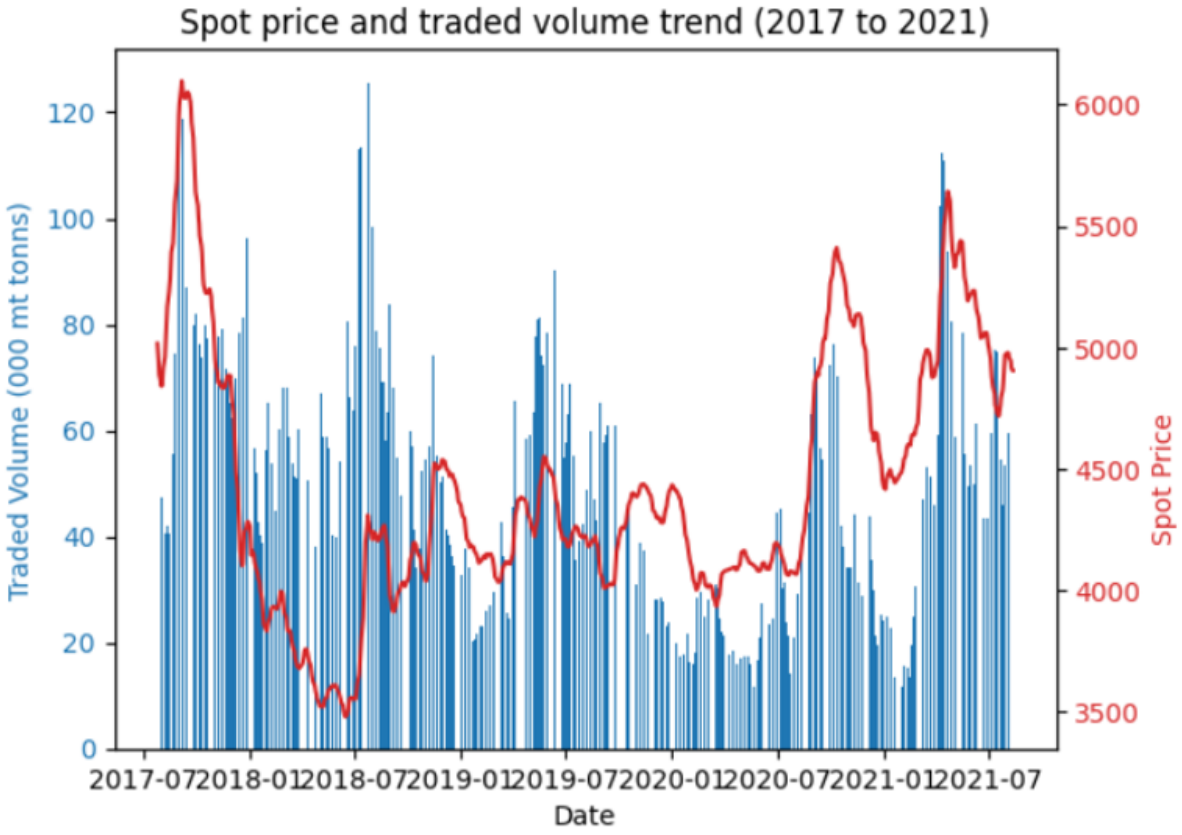


Fig 2.14(b): Spot price and traded volume for chana: 2017 to 2021
Interactive version https://plotly.com/~saras__sb/18/

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)

Null Hypothesis	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

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

Null Hypothesis	**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

Null Hypothesis	Lag Order	P-Value
Change in futures prices does not Granger causes change in spot prices	1	0.000
Change in futures prices does not Granger causes change in spot prices	2	0.000
Change in futures prices does not Granger causes change in spot prices	3	0.000

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 CFCs (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 CFC has been banned twice. The first ban was imposed in Feb 2007 and the second instance of suspension is a recent one in Dec 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 2.14 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 a little 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 2.15 plots the spot prices of wheat from 2009 to 2025. The structural break in the spot prices since 2013 is primarily 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.

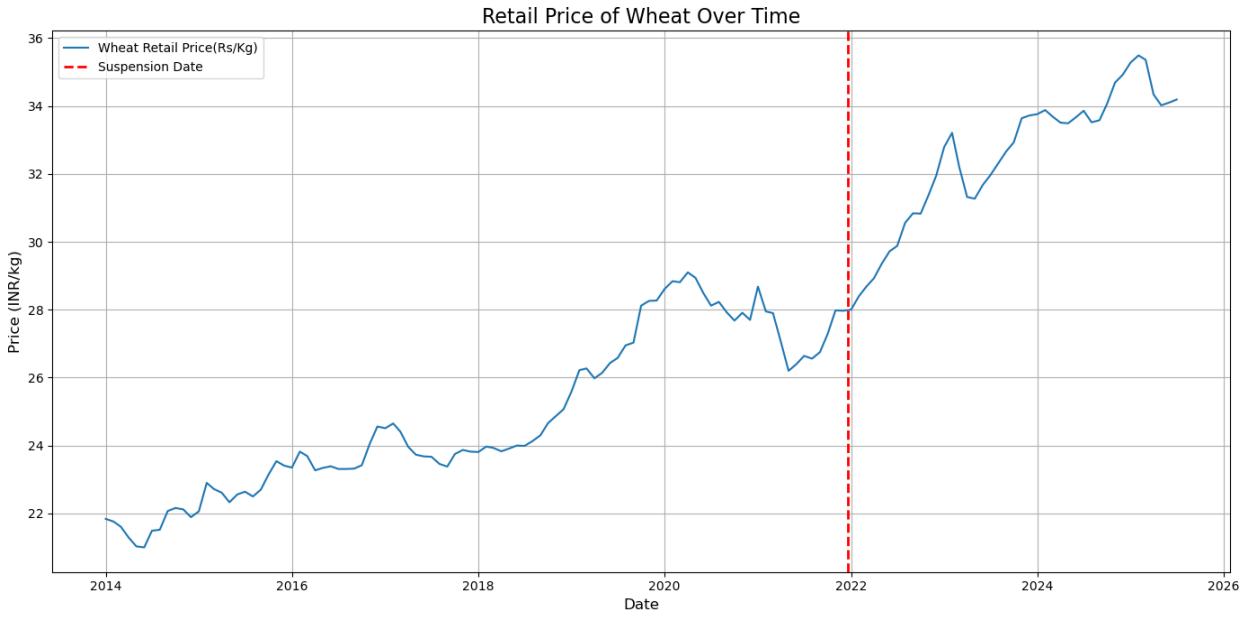
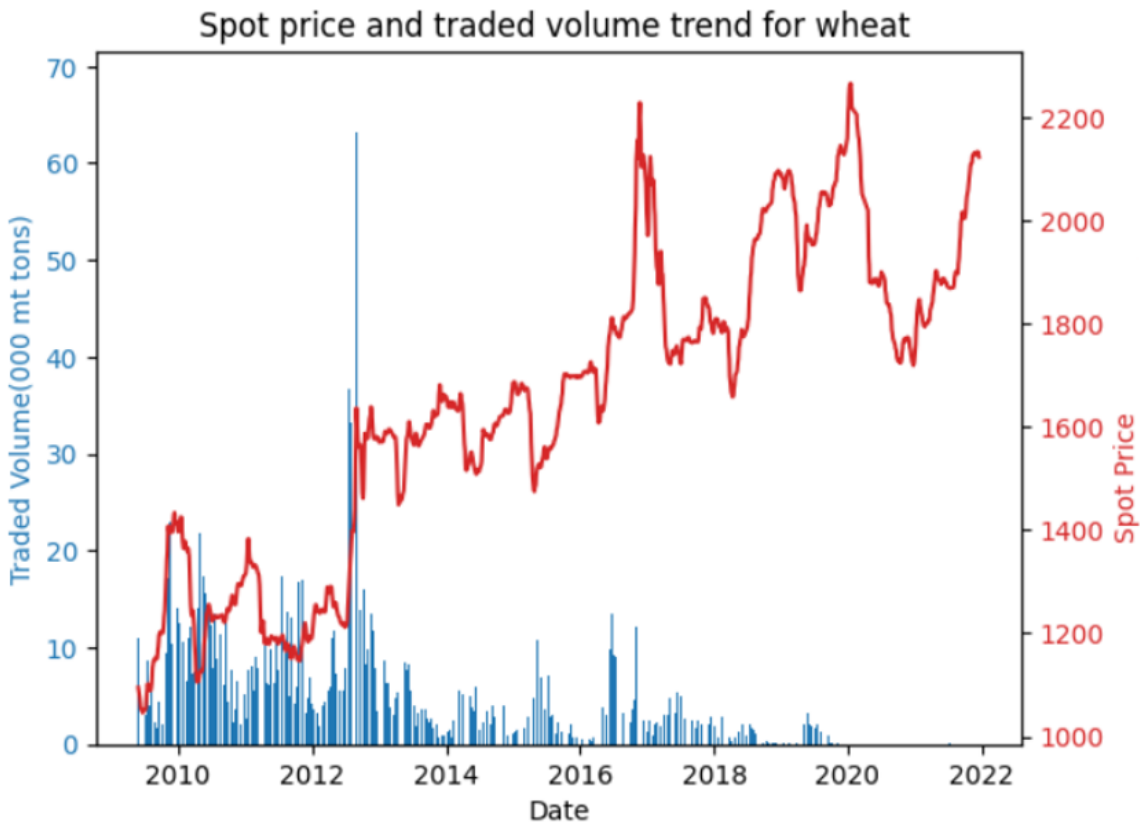


Fig 2.14: Retail price trend of wheat for period 2018 to July 2025

Fig 2.15 Spot price trend of wheat: 2009 to July 2025

In terms of the effect of traded volume on spot prices for wheat, Fig 2.16 indicates that trading in wheat has been relatively weak since its introduction in the exchange but a couple years before suspension in 2021, it had extremely weak trading.



Unit of spot price (in right y axis) is Rs/quintal

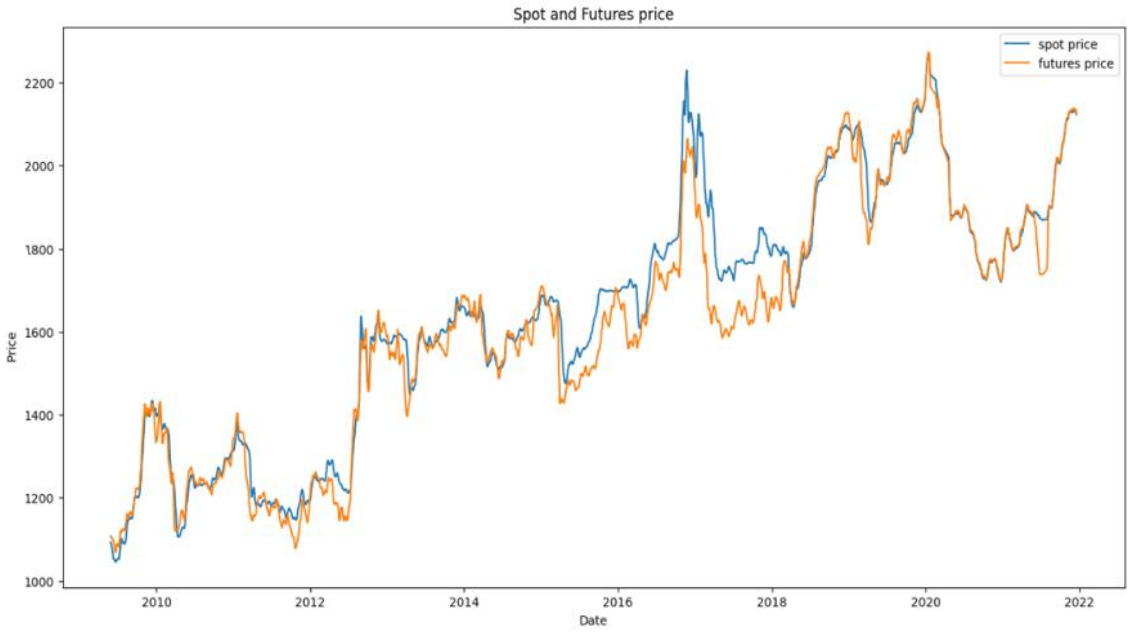
Fig 2.16 Spot price and trade volume for wheat: 2010-2022

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

Null Hypothesis	Lag Order	P-value
Traded Volume change does not granger causes spot price change	1	0.020
Traded Vol change granger causes spot price change	2	0.007
Traded Volume change does not 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.**

Next, we present the results on the relationship between spot and futures price for wheat.



Unit of y axis is Rs/Quintal

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

As seen from 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.[7] 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

[7] 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.

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

Null Hypothesis	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 are I(1) and are cointegrated in the long term.

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 CFC, volatility of prices of commodities should go down. Table below shows the comparison of volatility before and after suspension of CFC. 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 of return has been taken as a volatility measure. 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'.[8]

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

(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
Retail(two month)	0.008	0.009

(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

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

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 CFC has clearly not resulted in reduction of volatility of spot and retail prices of commodities except wheat in the post-ban period.**

In this analysis, we compared the price volatility of suspended commodities not only before and after the policy intervention but also against their closest peer commodities. This helped us assess whether the suspension led to a relatively larger reduction in volatility for the treated commodities compared to the control group.

Since the data is time series in nature and likely to exhibit heteroscedasticity, we used the GARCH model to estimate volatility accurately. This approach captures time-varying fluctuations in prices. The graphs below show the volatility trends for mustard, soy oil, and chana.

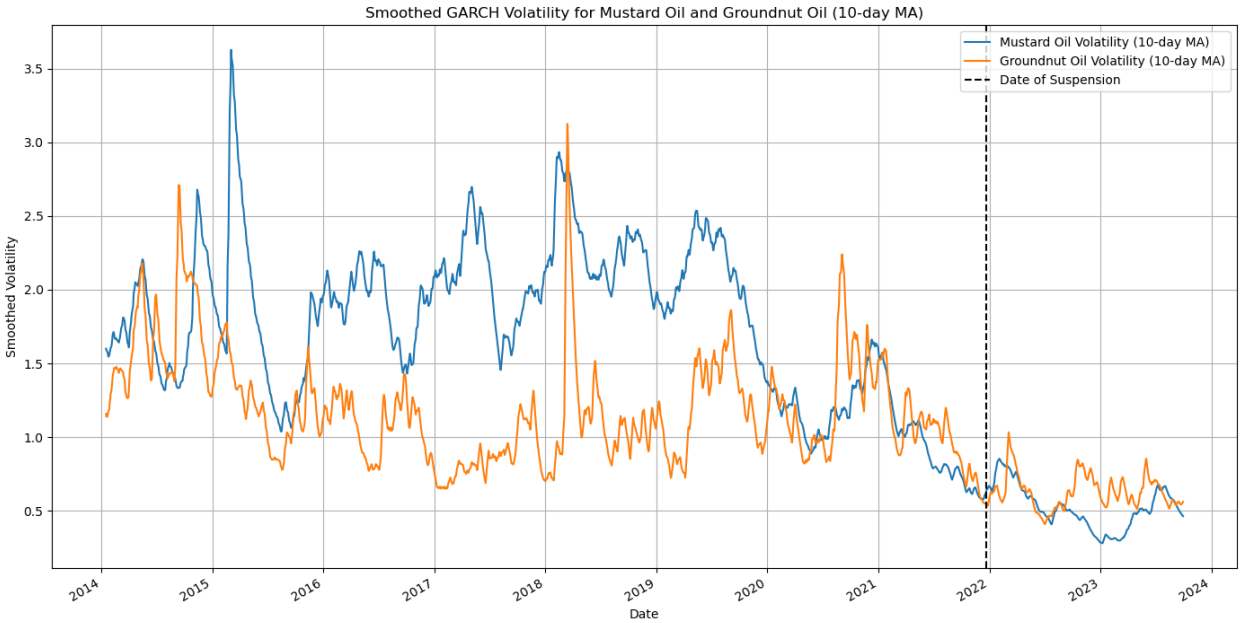


Fig 2.18 GARCH Volatility for Mustard Oil Vs Groundnut Oil : 2014 to July 2025

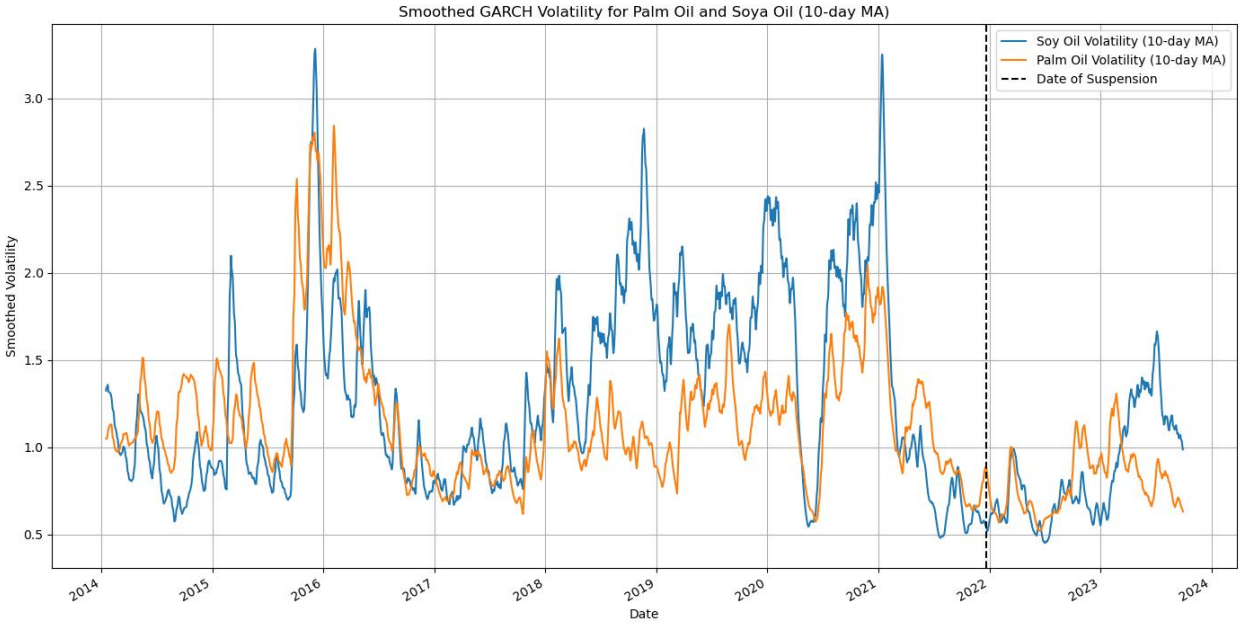


Fig 2.19 GARCH Volatility for Soy Oil Vs Palm Oil : 2014 to July 2025

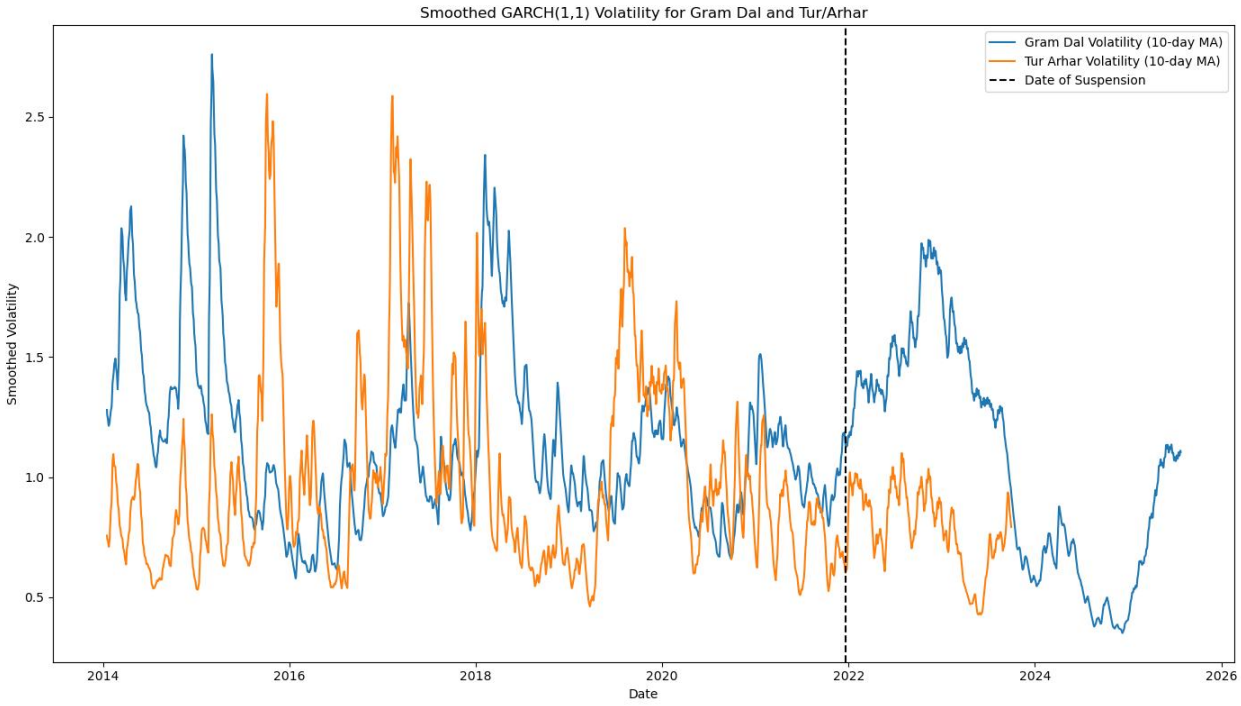


Fig 2.20 GARCH Volatility for Chana Vs Tur : 2014 to July 2025

Looking at these graphs, we observe that the volatility of the suspended commodities generally follows a similar pattern to that of their peer commodities. For example, mustard's volatility closely tracks that of groundnut for about six months after the suspension. However, it later exhibits slightly higher volatility, followed by lower volatility compared to groundnut—suggesting no consistent pattern or clear impact of the suspension. A similar trend is seen in the cases of soy oil and chana, indicating that the suspension did not lead to a distinct or lasting change in volatility.

2.3.7 Comparison of volatility of suspended commodities with its domestic peers 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.[9]

Table 2.12 Suspended commodities and their domestic and international peers

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-ban and post-ban volatility as well as six month pre-ban and post-ban 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.

Fig 2.21a-2.24a show volatility comparison with peers for three months around suspension (pre and post) for mustard, soy oil, wheat, and chana respectively while Fig 2.21b-2.24b show volatility comparison for six months around the suspension date for the same commodities, respectively.

Observations of volatility analysis of peer group is given later in this section.

[9] Data for international peers and domestic peers are provided by NCDEX. Spot prices on domestic commodities are polled prices collected by NCDEX.

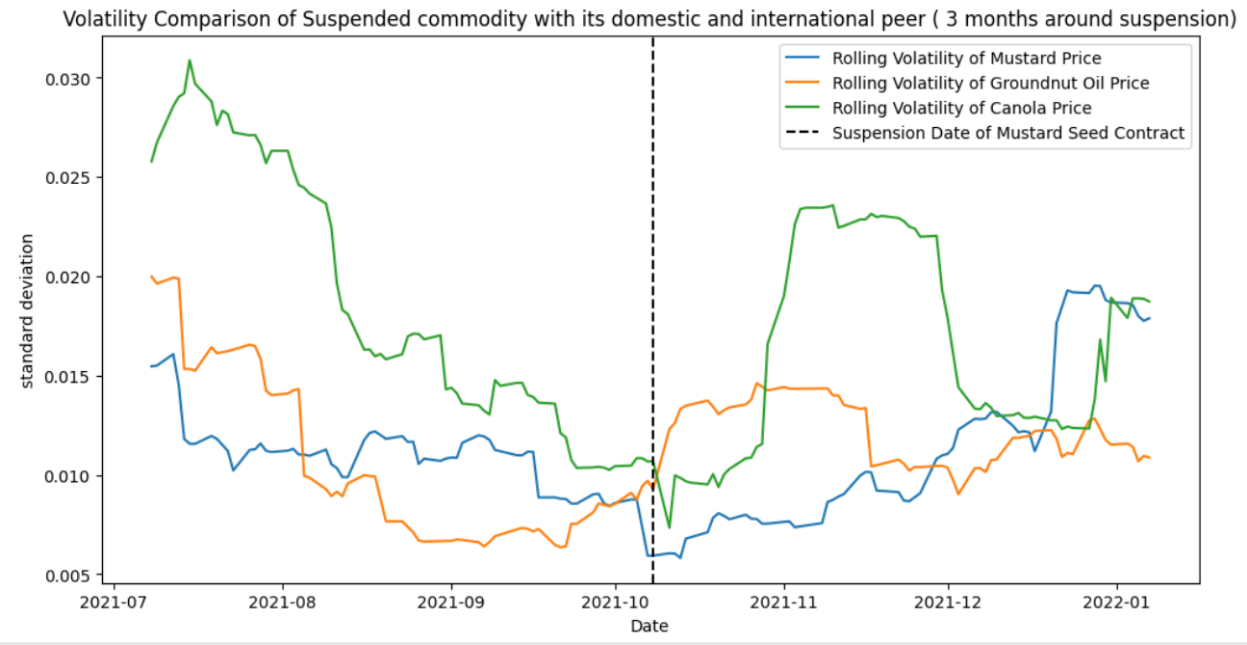


Fig 2.21a Mustard, 3 months around suspension

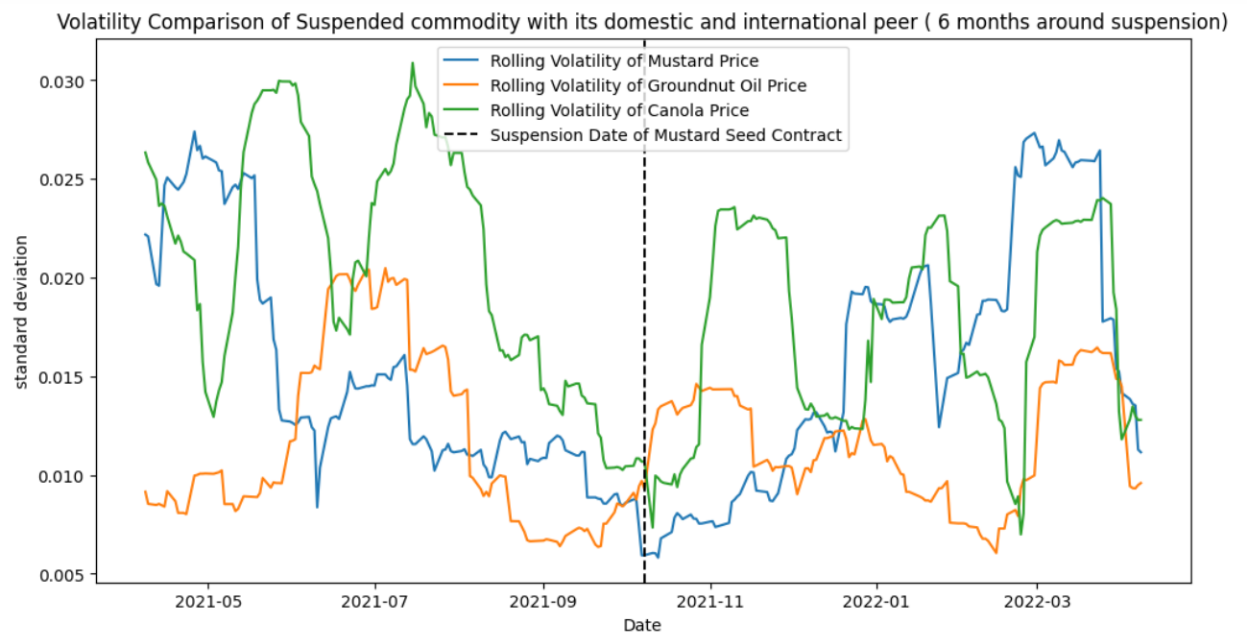


Fig 2.21b Mustard, 6 months around suspension

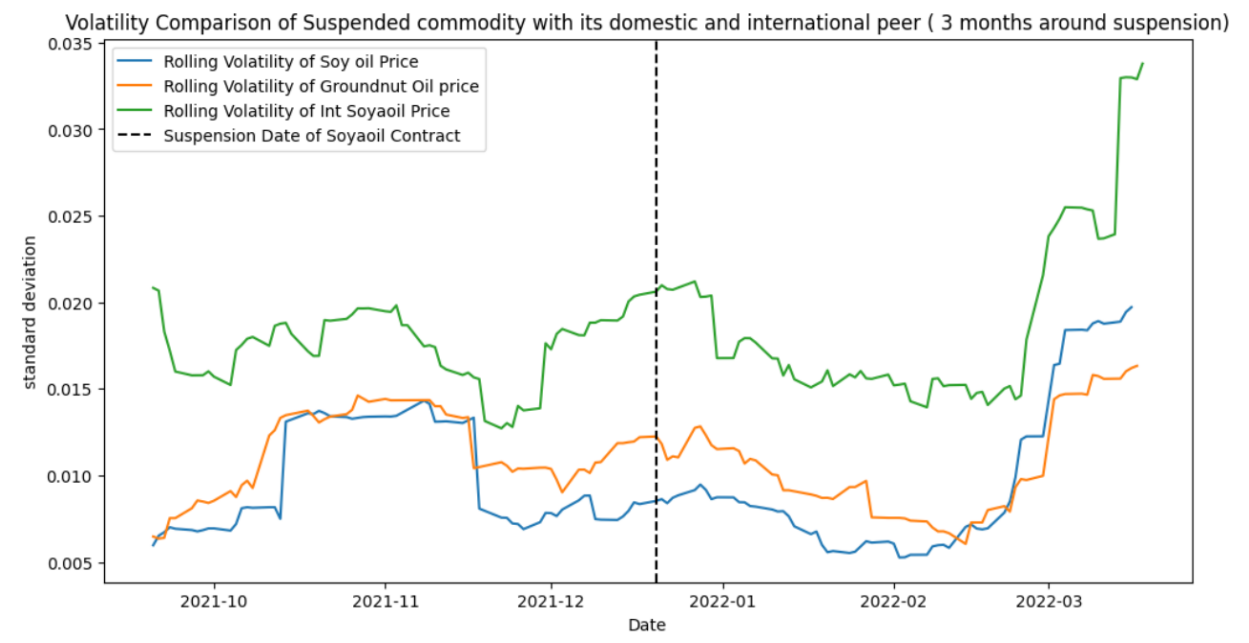


Fig 2.22 Soy oil, 3 months around suspension

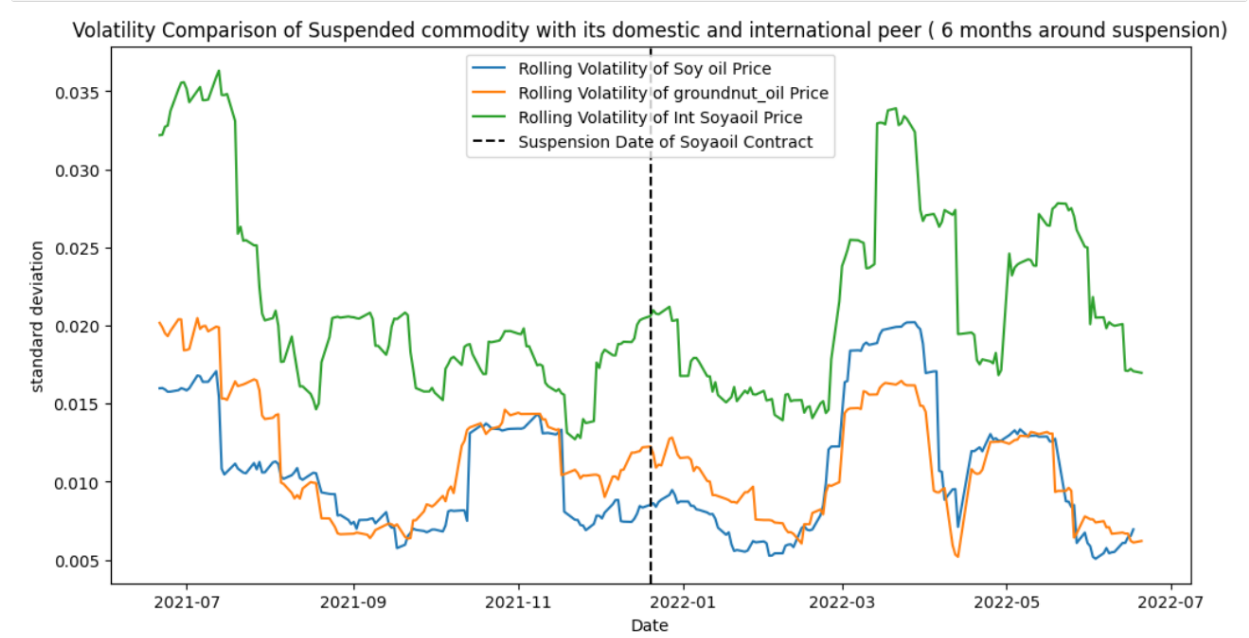


Fig 2.22b Soy oil, 6 months around suspension

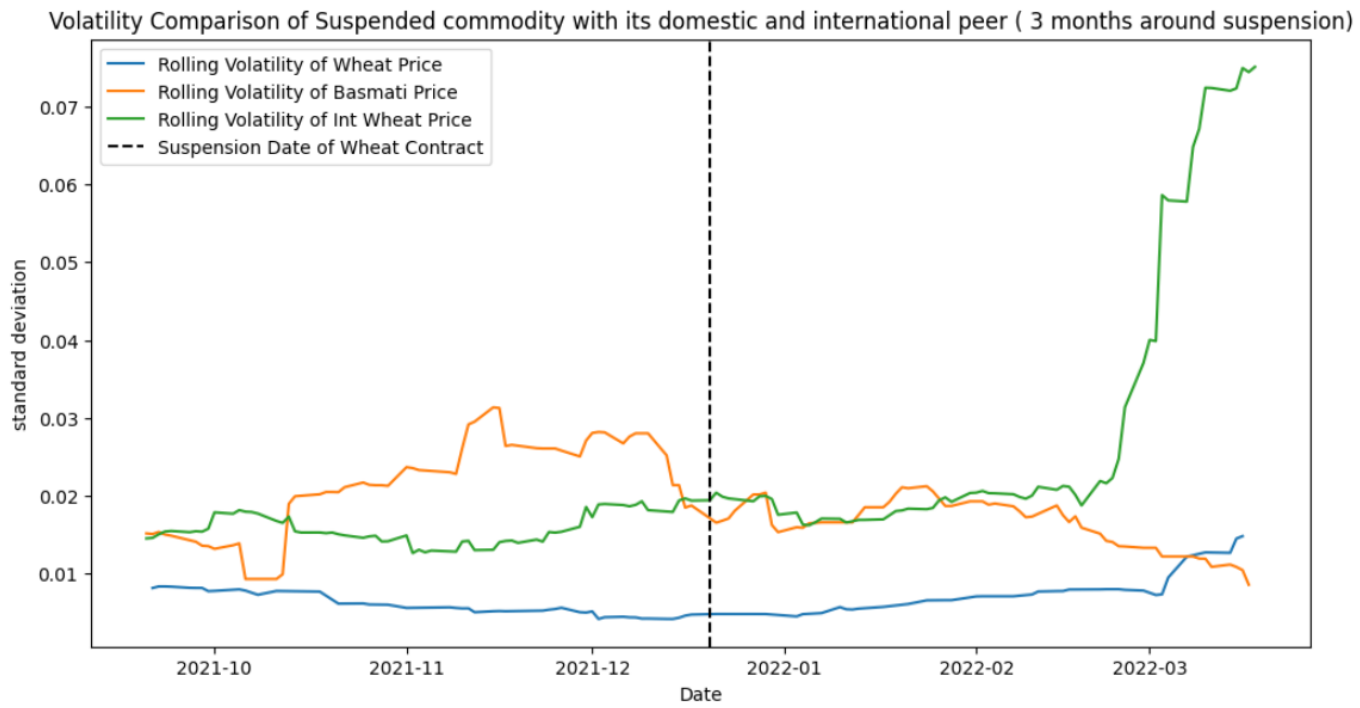


Fig 2.23a Wheat, 3 months around suspension

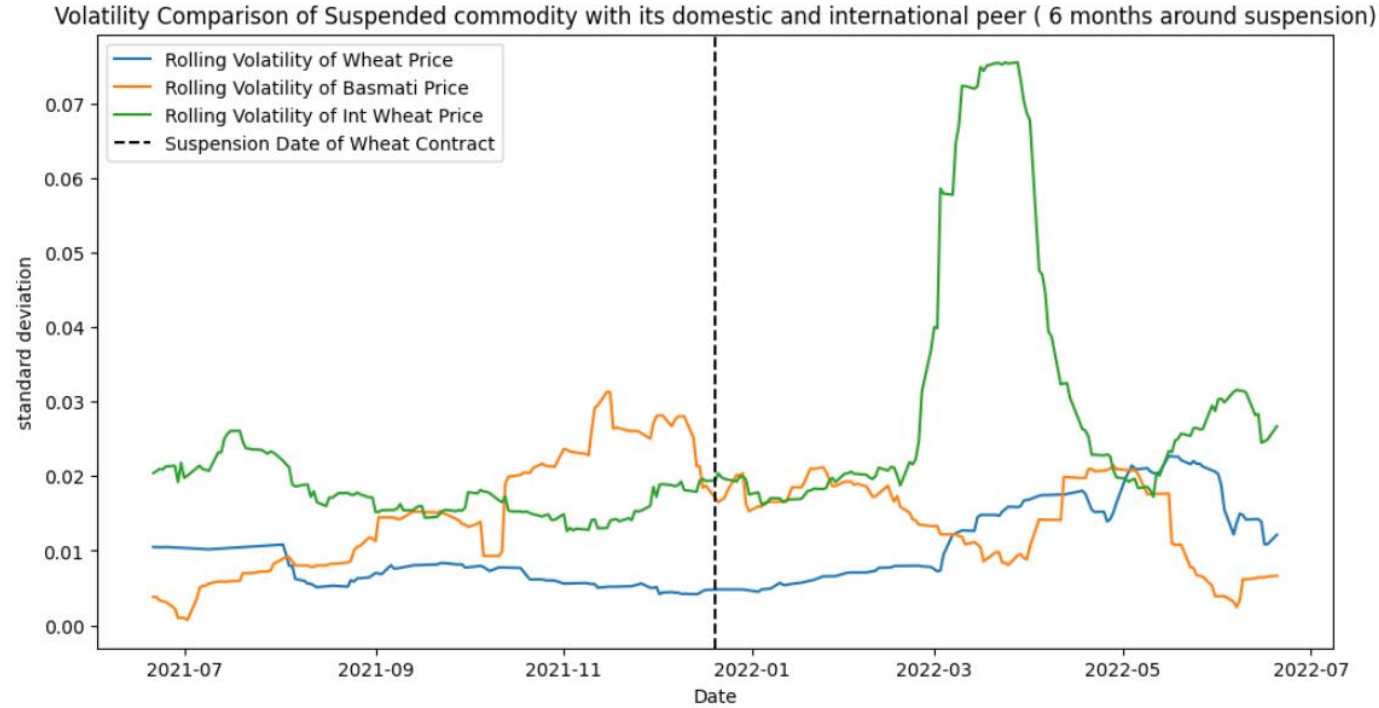


Fig 2.23b Wheat, 6 months around suspension

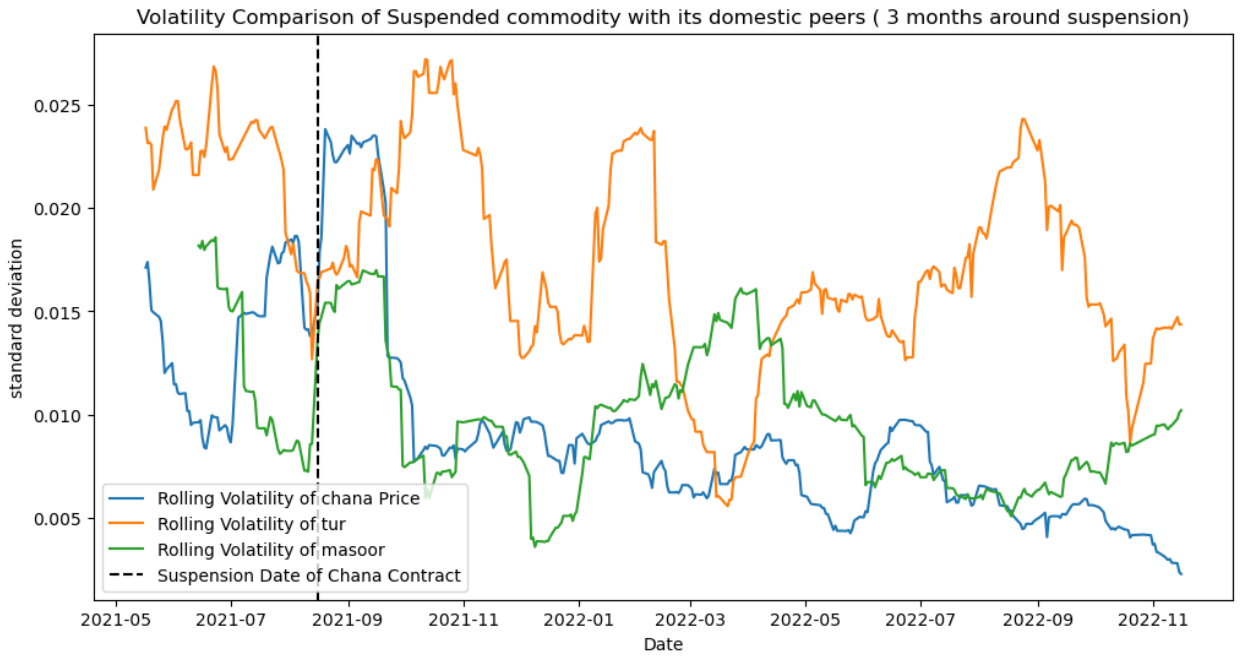


Fig 2.24a Chana, 3 months around suspension

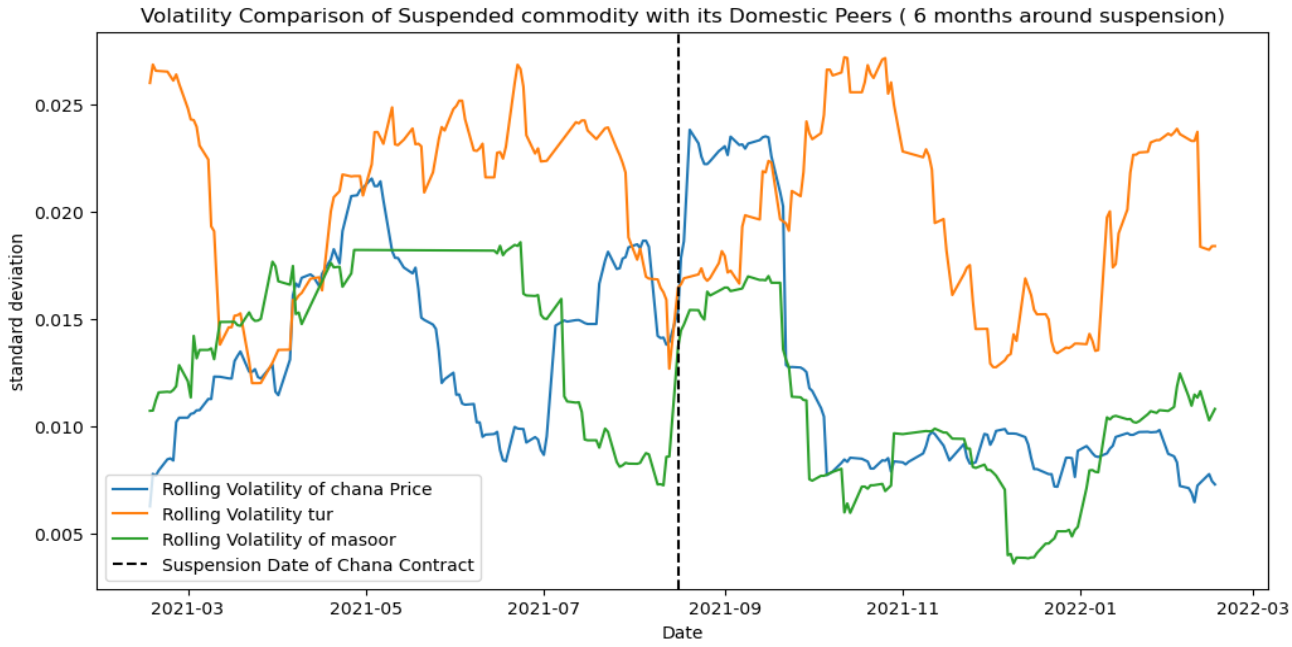


Fig 2.24b. Chana, 6 months around suspension

Groundnut has been taken as a domestic peer for oilseeds-mustard and so 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.

It is evident in plots 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 Dec 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. *So 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 2 month after suspension, and this rise is accompanied with rise in volatility of its domestic and int peers both. One interesting observation is that volatility of spot price return of soy oil is moving closely with that of groundnut(domestic peer) and its inter peer. So two months after suspension, volatility of int soy oil price return, groundnut and domestic soy oil all surged together. If suspension really had calmed down volatility in spot prices of mustard, volatility should have remained lower than pre suspension level, but it was not the case. So suspension has no impact on soy oil volatility as it moves with the volatility of its peers.

Volatility of wheat remained stable over time before and after suspension. After suspension volatility didn't go down rather remained at the pre suspension level. It went up after three months of its suspension when volatility of int wheat rose higher. If suspension has worked positively then volatility must have come down after suspension.

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 CFCs 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.

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.[10] 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 implemented 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 2.25-2.29 show 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.

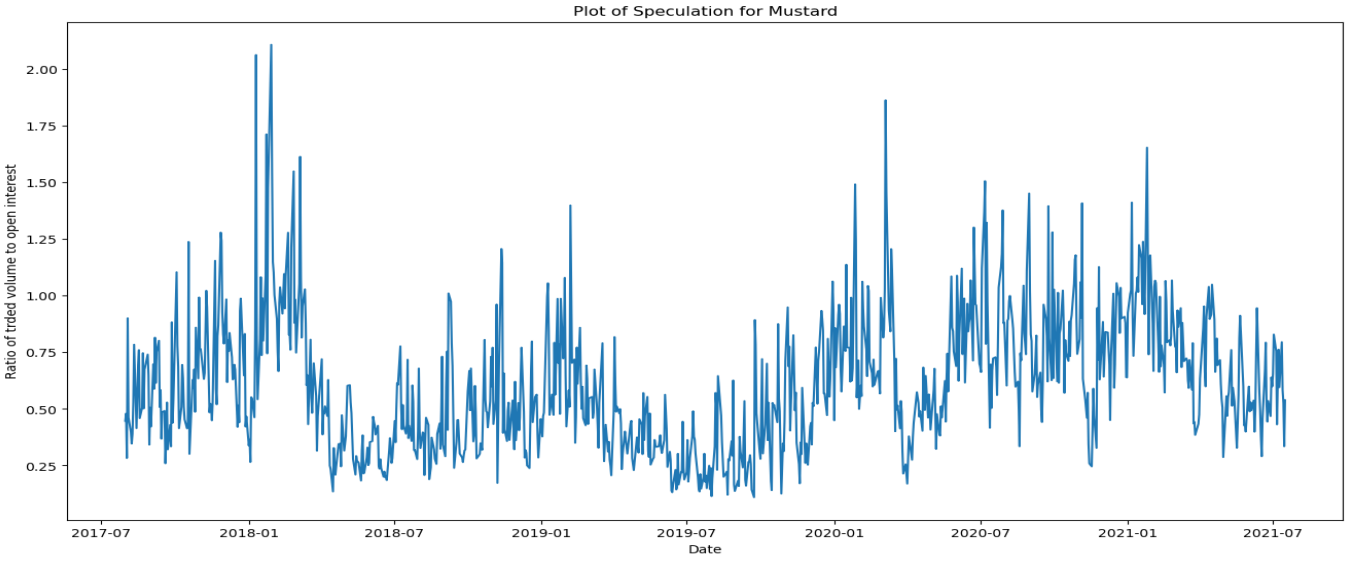


Fig 2.25 Speculation for mustard: 2017 to 2021

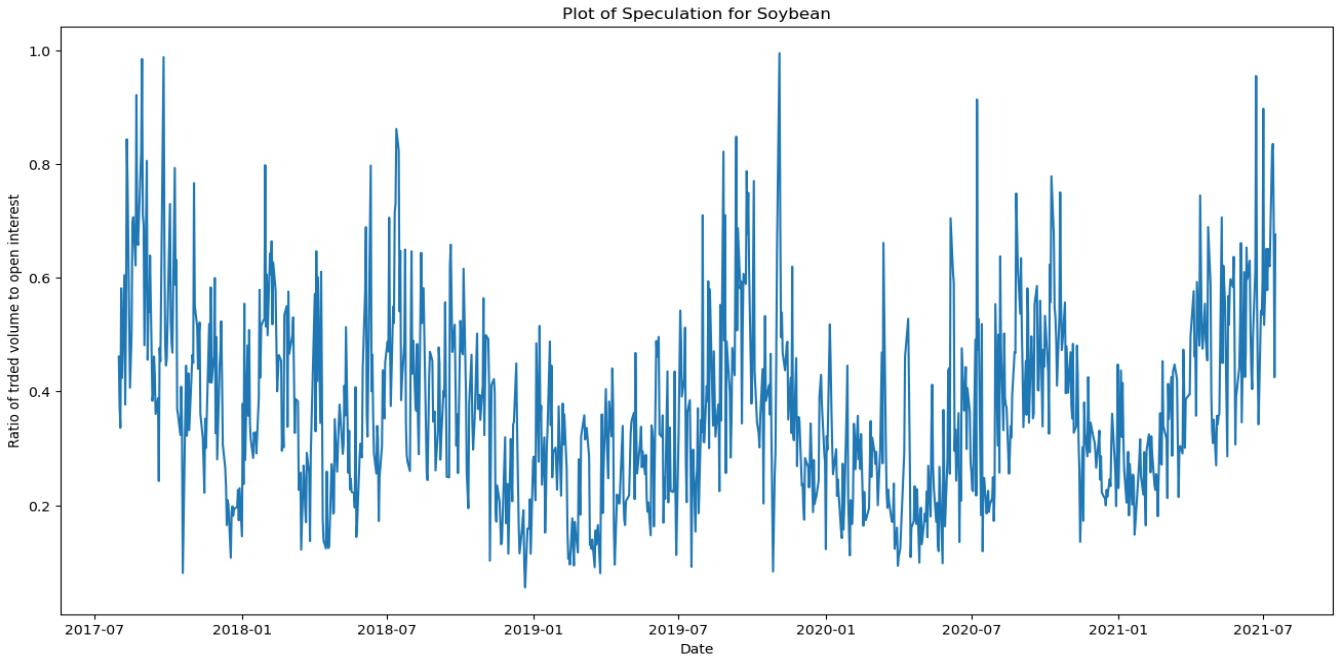


Fig 2.26 Speculation for soybean: 2017 to 2021

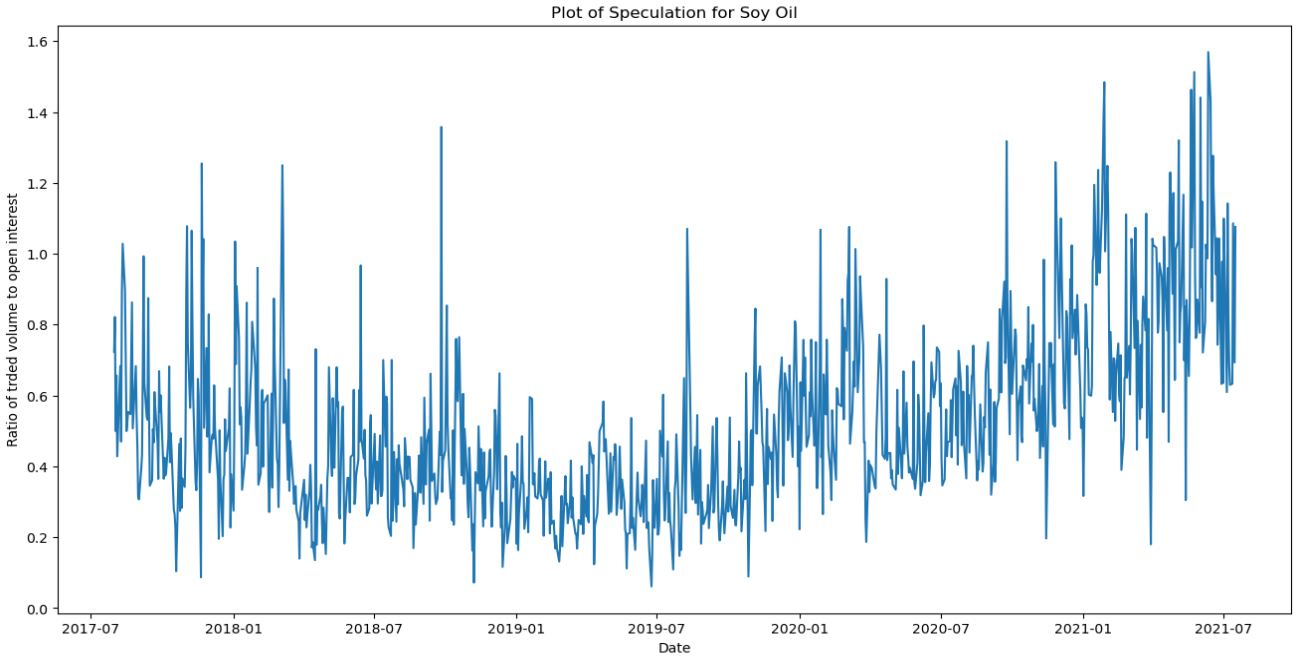


Fig 2.27 Speculation for refined soy oil: 2017 to 2021

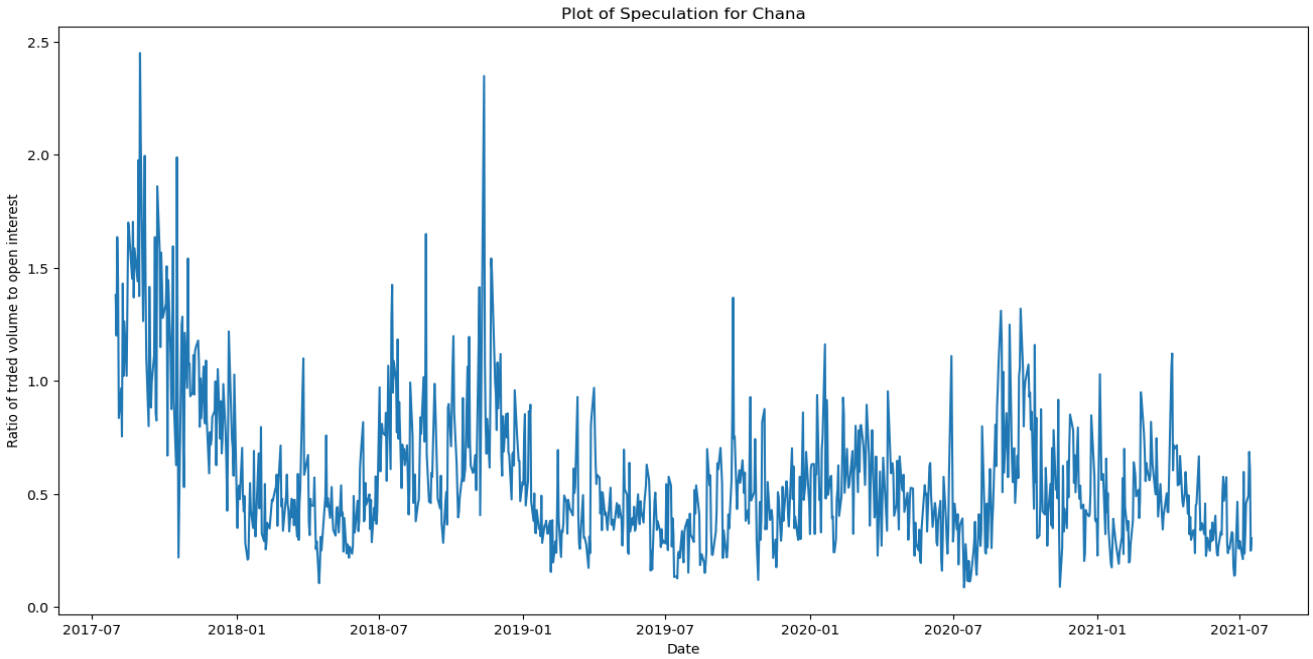


Fig 2.28 Speculation for chana: 2017 to 2021

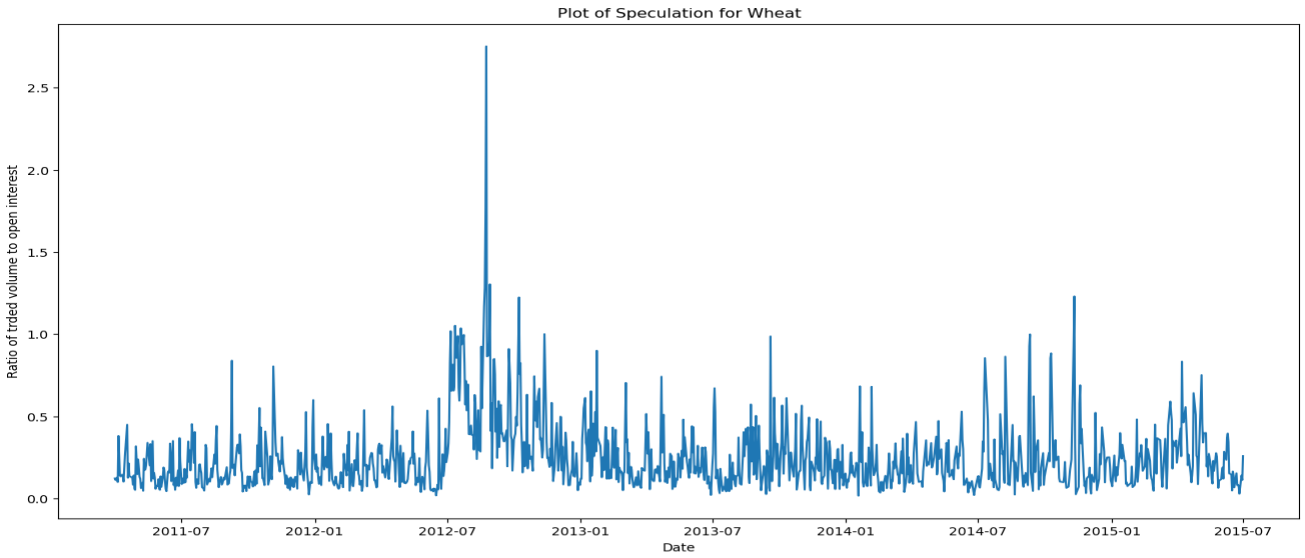


Fig 2.29 Speculation for wheat: 2011 to 2015

Table for Granger Causality test between Speculation and Spot Prices for all the commodities For the Granger causality test between speculation and spot prices for the respective commodities, our null hypothesis is **speculation is not granger causing spot prices**. Based on the p-value at different lag order given below in Table 2.13, we conclude for which commodities speculation is Granger causing spot price

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

At the 5% level of significance, **we reject the null hypothesis only for refined soy oil**. For this commodity, there is evidence that speculative trading in the futures market is affecting the spot price and for the other commodities there is no evidence that speculative trading in the futures market increases the spot price in the domestic market.

2.3.8 Relationship between international and domestic prices of soybean oil

As there has been insights that soybean and soy oil follows 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 2.30 shows the plot of normalized cumulative series.

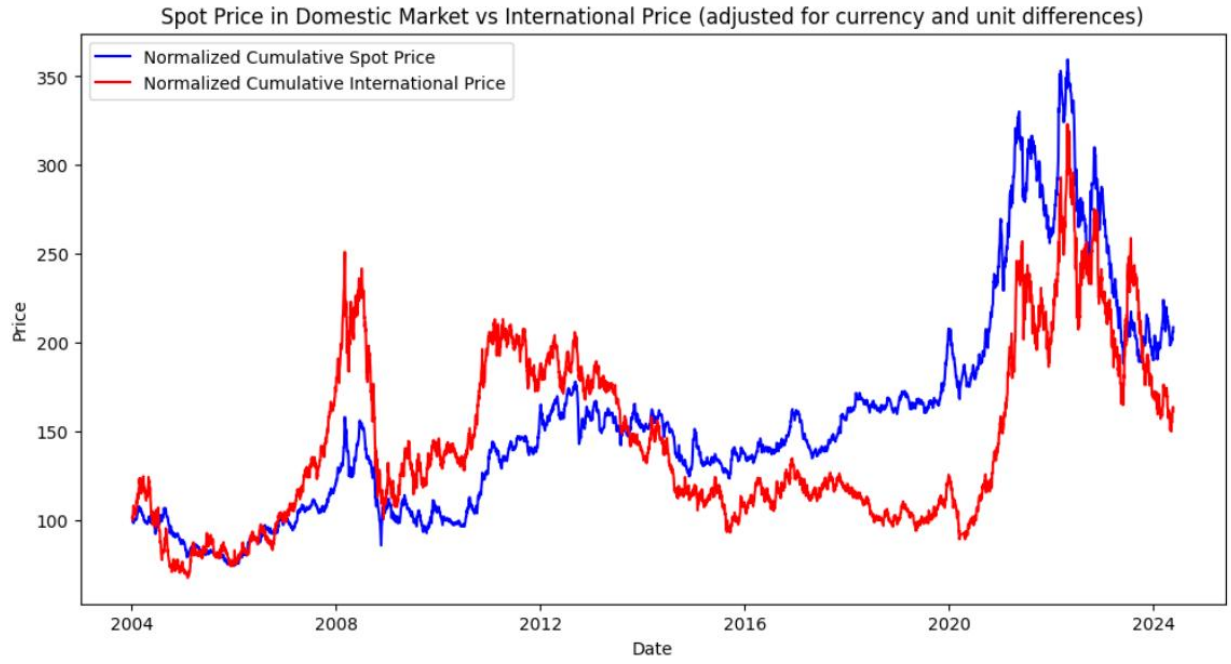


Fig 2.30 Spot price in domestic market and international price for soy oil
Note: Time frame covered is from 2004 to mid 2024. Data on international price of soy oil was provided by NCDEX.

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

Null Hypothesis	**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 the first difference of both series.

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

Null Hypothesis	**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 CFC.

Table 2.16 shows that frequent suspension instances hurts 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 haven't witnessed relaunching.

It is noticeable in the table that average daily trading volume, for all commodity futures, has dropped after the relaunch in comparison to pre ban level.

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

2.3.10 Difference in Differences Estimation of Comparative Volatility of Suspended Commodities

To estimate the causal impact of the suspension of commodity futures trading, we employ a **Difference-in-Differences (DiD)** approach. The analysis is restricted to a **six-month window before and after the suspension**, which helps minimize the influence of external shocks—such as the Russia-Ukraine war or sudden changes in trade policy (e.g., export/import bans)—that might otherwise affect price volatility in both treated and control commodities.

Key Assumptions of DiD

The DiD method relies on two main assumptions:

1. **Parallel Trends**: In the absence of the suspension, the price volatility of treated and control commodities would have followed similar trends.

2. **No Simultaneous Exogenous Intervention**: There should be no other significant policy or market shock affecting only one group during the study period.

However, a key challenge we encountered was the **violation of the parallel trends assumption**. The pre-intervention trends of treated and control commodities diverged in all cases. To address this issue, we included **group-specific linear time trends** in the regression model. This adjustment attempts to account for systematic differences in trends between treated and control groups. The idea is that even if the levels or slopes of the trends differ, any linear relationship between the two can still be captured. However, this correction is limited—**non-linear (e.g., polynomial) relationships between trends cannot be adequately captured**, so the results should be interpreted with caution

Choice of Control Group

We selected peer commodities as controls based on their market similarity to the suspended commodities to ensure a credible counterfactual. The treated and control pairings are listed below:

Treated Commodity	**Control Commodity**
Mustard Oil	Groundnut Oil
Palm Oil	Palm Oil
Chana	Tur

To measure fluctuations in price, we first calculated the **GARCH-based volatility** of retail prices for both the suspended commodities and their respective control counterparts. GARCH models are particularly suitable for this type of time series data as they effectively capture heteroscedasticity and volatility clustering.

We then applied the DiD method on the **estimated volatility values** over the 6-month window surrounding the suspension date to evaluate the **impact of the Commodity Futures Contract (CFC) ban**.

Our **null hypothesis** assumes that the suspension had no impact on volatility. If the suspension was effective, we would expect to see a significant **decrease in volatility for the treated commodities** relative to their peers.

For visualization and interpretation, we plotted the volatility trends of the treated commodities alongside their peers. Due to data availability, we focused our detailed analysis on three commodities: **soy oil, mustard oil, and chana**, for which peer commodity price data was available. The lack of comparable data for the remaining commodities limited our ability to extend the analysis to the full sample

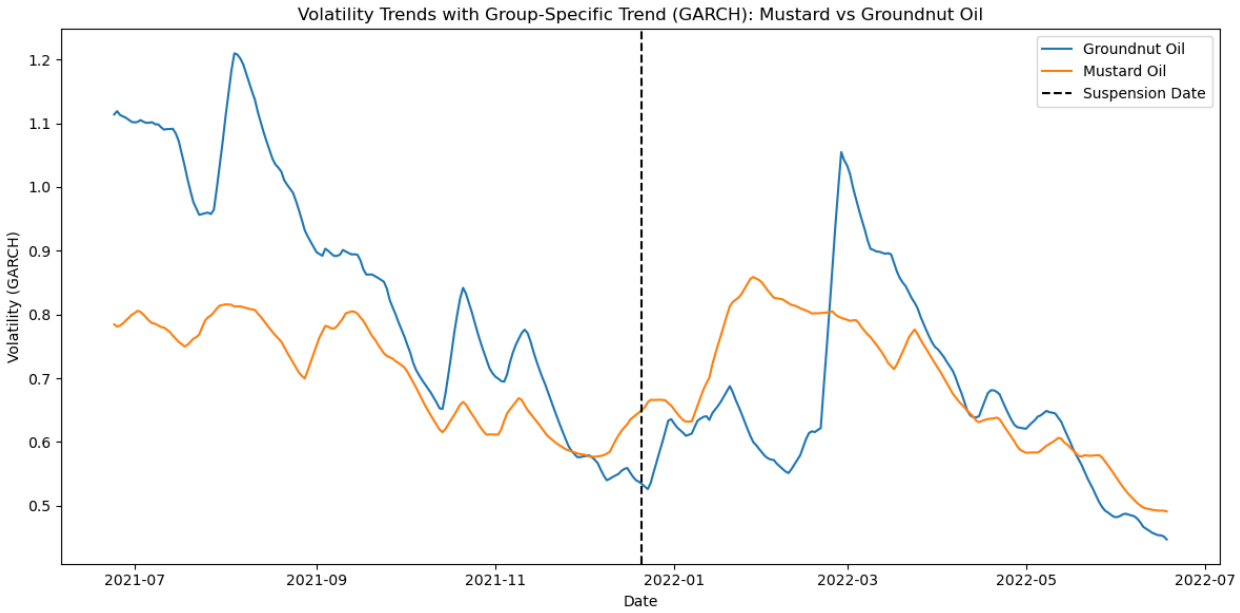


Fig 2.31 GARCH Volatility around suspension period: Mustard Oil Vs Groundnut Oil

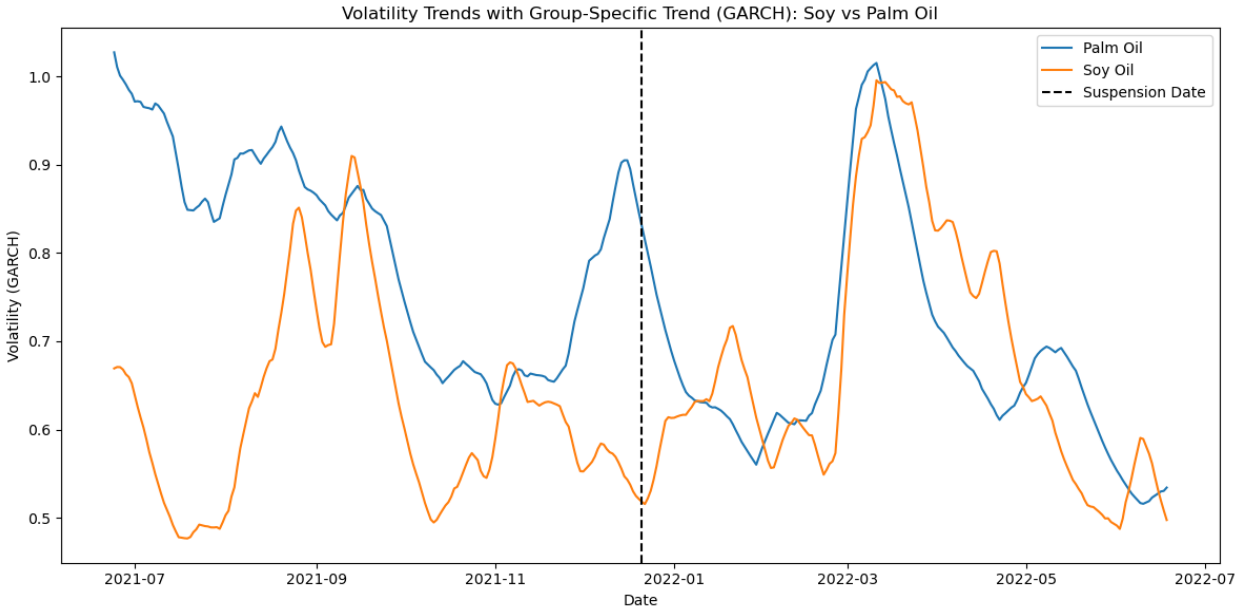


Fig 2.32 GARCH Volatility around suspension period: Soy Oil Vs Palm Oil

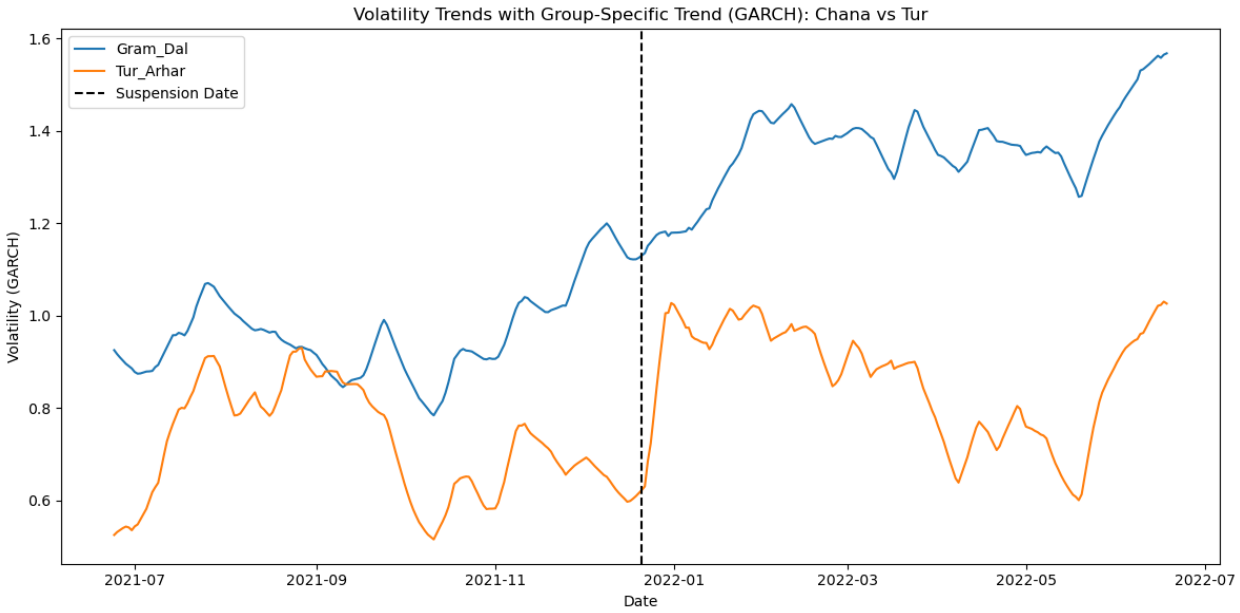


Fig 2.33 GARCH Volatility around suspension period : Chana Vs Tur

Table 2.17 : Results of the Difference-in-Differences (DID) Regression

Commodities	Control	Coefficient of the Interaction Term	P-value of the Interaction Term
Mustard Oil	Groundnut Oil	0.038	0.305
Soy Oil	Palm Oil	0.032	0.132
Chana	Tur	-0.560	0.086

The DID regression results indicate that none of the interaction term coefficients are statistically significant, as all p-values exceed the 0.05 threshold. For instance, the coefficient for mustard oil is 0.038, suggesting that post-suspension, GARCH volatility for mustard oil is, on average, 3.8% higher compared to groundnut oil. However, the associated p-value of 0.305 implies this difference is not statistically significant. Similarly, the coefficients for soybean (0.032) and chana (-0.560) are also not significant. Therefore, our DID analysis suggests that the suspension of commodity futures contracts has not led to a significant reduction in the volatility of any of the examined commodities.

2.4 Discussion and Policy Implications

Our examination of the effect of the suspension of CFC 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 the purported reasons for which the suspension was imposed namely the regulator and central government's concerns about futures trading of CFCs 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.[11]

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 CFCs 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) registers a decline in volatility in the post-ban period. International peer group and domestic peer

[11] While there are several studies that show that the relationship between MSP and food inflation is positive (e.g Sekhar *et a*l. 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).

group analysis of select commodities also suggests that there is more to it than what meets the eyes in terms of cointegration and Granger causality of price levels, suggesting the need for deeper examination of transmission mechanisms rather than abrupt regulatory shocks such as bans.

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 banned 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 banned 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 for specific commodities they studied. As commented by Jacob and Gopalkrishnan (2023, p.4), such

reduction in volumes traded is not unexpected as “derivative trading is sluggish to move across markets, given the long-cycle nature of derivative trading’. 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 the trading of the commodities futures contracts. 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

It can be argued that In the absence of CFCs to hedge price risk and distortions in price discovery, it is likely that value chain participants across the suspended commodities have been adversely affected. However, whether value chain participants have experienced pertinent challenges following the suspension and whether all value chain 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 groups 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 or 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 Survey and 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 CFCs on the agri ecosystem, in this chapter, we present insights from a month-long primary research of several participants of commodity value chain across three states of India. 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 and non-participants in the futures market suggests that there has been more harm than good rooted in the suspension of CFC 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 VCPs 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

Our primary data collection comprised interactions with physical market participants namely VCPs, non-participating actors in the commodity value chain 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 along with a limited list of value chain participants (VCPs) provided by NCDEX and nodal agencies.

Between June and July 2024,we reached out to various actors in the commodity value chain in the three states: Maharashtra, Madhya Pradesh, and Rajasthan. **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. In total, we have **70 valid responses** for our quantitative analysis. We conducted several **key stakeholder interactions of physical market participants and non-participants including FPOs and CBBOs** that also informed our analysis significantly.

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 1) and semi-structured questionnaires for key stakeholder interactions. Following our pilot surveys to improve the design of the questionnaires, we began our surveys. The structured questionnaires were administered through in person surveys using KOBO tool. In a few cases, respondents emailed us their responses.

3.3 Insights from Survey of Physical Market Participants

Table 3.1 presents the characteristics of the 70 respondents in the physical market participant survey.

3.3.1 Respondent Characteristics

43 of the 70 firms in our survey were listed. Table 3.1 reports the different activities of the firms represented. A majority were involved in trading and brokering (see Table 3.1). 21 were involved in provision of warehouses. 10 were involved in processing while 55 played the role of wholesalers and 26 had distribution activities. Over half were involved in export and import. As shown in Table 3.2, most of the respondents were involved in sourcing and procurement followed by storage, own distribution, and packaging.

44 respondents are members of different associations, one-third of whom are members of NCDEX, as shown in Table 3.3.

Table 3.1: Roles of value chain participants

Roles	Number of responses
Trader	64
Broker	44
Warehouse provider	21
Processor	10
Wholesaler	55
Distributor	26
Import/Export	36
Lending agency	5
Others	1
Total respondents	70

Note: Multiple responses allowed per respondent.

Table 3.2 Major businesses handled by physical market participant

Major Business	Number of responses
Sourcing and Procurement	63
Processing and Manufacturing	14
Quality Control	27
Packaging	35
Storage of raw and finished goods	47
Own logistics and distribution	39
Research and development facility	9
Risk management (Hedging in commodity markets)	5
Others	1
Total respondents	70

Note: Multiple responses allowed per respondent.

Table 3.3 Membership of associations

Association	Number of respndents
National Commodity and Derivatives Exchange (NCDEX)	15
National Multi Commodity Exchange (NMCE)	2
ACE Derivatives & Commodity Exchange Limited	1
Multi Commodity Exchange of India (MCX)	1
Universal Commodity Exchange Limited	1

Others	27
N	44

Table 3.4 Commodity handled by physical market participants

Commodity	Number of respondents
Mustard	55
Wheat	45
Chana	48
Soybean	12
Refined Soy oil	3
N	70

In terms of the commodities handled by the firms, most handled mustard, wheat, and chana. Few firms handled soybean. As discussed in our methodology 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 country.

3.3.2 Aspects of the Futures Suspension

We asked about the primary, secondary, and tertiary factors in order of importance in terms of what the respondents think contributes to the price volatility in the commodities they handle. As shown in Table 3.5, weather and climatic conditions emerged as the most important primary factor followed by demand supply dynamics. Those who report currency fluctuation as a factor in influencing price volatility, are most likely the firms in export and import or having international futures trading activities. 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.

Table 3.5 Top three factors causing commodity price volatility

	Primary factor	Secondary factor	Tertiary factor
Weather and climate conditions	37	13	4
Demand-Supply Dynamics	20	13	13
Previous Year Stock	5	6	5
Global Economic/Market conditions	3	13	4
Geopolitical events		1	1
Currency fluctuations	1	5	12
Speculation in commodity market	4	8	8
Transportation cost		5	8
Supply chain disruption			3
Regulatory changes by government		6	10
Others			2
Total respondents	70	70	70

Table 3.6 Effect of futures ban on operations

	Cost increased	Cost decreased	Cost not changed	Don't know
Storage cost (N=69)	45	5	9	10
Grading cost (N=69)	51	1	11	6
Transport cost (N=70)	57	1	10	2
Handling cost (N=68)	44	9	5	10
Wastage / Losses (N=70)	24	9	24	13
Interest Cost (N=70)	57	3	3	7
Depreciation (N=70)	34	6	13	17
Admin/ Operating cost (N=69)	49	1	9	10

In terms of the effect of the CFC trading ban on different aspects of their firm's 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. 24 reported increase in cost due to waste and losses whereas 34 reported losses due to depreciation. Nearly 50 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.

Table 3.7 Price risk fluctuation management strategies

	First strategy	Second strategy	Third strategy
Forward contracts	13	11	7
Futures contract in domestic market	27	11	3
Futures contract in international market	3	1	4
Stock holding	13	24	8
Long term contracts with suppliers and customers	6	11	23
Goods insurance	3	7	9
Inventory management	5	5	11
Others	0	0	5

Total respondents=70

We do not have reasons to believe that most of the respondents did not have awareness about the futures market and developments in the futures market as **55 respondents reported being aware of developments in the futures market and 45 reported being aware of the suspension of CFCs.** What determines participation in the futures market is modeled later, but it must be borne in mind that mere self-reported awareness about futures market suspension is not sufficient, and we need to understand the degrees of awareness about suspension. As shown in Table 3.8, **30 respondents had moderate to advanced understanding whereas 8 reported having expert understanding of the matters**. By contrast, 8 reported having basic understanding and 9 reported having limited understanding and awareness of what is going in the futures market.

Table 3.8 Understanding and awareness about suspension

	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	8
N	55

In terms of participation in futures trading currently or in the past, **about one-third reported having participated in the futures market**. Table 3.9 reports the proportion of their commodity turnover that they trade in terms of lots in the futures market. 25-50% is the most common response. Other related responses regarding these participants in futures markets are reported in Tables 3.10-3.12

Table 3.9: Proportion of total commodity turnover that is traded by those participating in futures trading

Proportion	Number of VCPs
<10%	5
10-25%	0
25-50%	10
50-75%	4
>75%	0

No response	5
N	24

Almost everyone among the 24 participants found affordability of participation not a constraint. In terms of major challenges experienced at the futures platform, as shown in Table 3.10, limited hedging opportunities is a major challenge for participants followed by challenges in tracking futures prices.

Table 3.10 Top three challenges on the futures platform

	First challenge	Second challenge	Third challenge
Deciding strike price	3	0	3
High transaction cost	3	2	0
Lack of Standardization for some commodities that company process	1	3	2
Lack of confidence in the segment/instrument due to frequent suspensions	1	0	1
Limited Hedging Opportunities	**6**	**4**	**6**
Providing for various margins	1	0	2
Regulatory Compliance	3	1	1
Tracking futures prices	4	9	3
Understanding technical terms and conditions	0	2	2
Executing transaction	0	2	3
Inadequate market information	0	0	1
Others	2	1	0
N	24	24	24

Online platforms and personal networks are the most important source of information on spot and futures price for the participants, followed by social media and WhatsApp. Other companies are also an important source of information but it is striking to know that only one of the 24 who participate in the futures market reported relying on APMC for price information.

Table 3.11 Sources of spot and futures price information

Source	Number of VCPs
APMC	1
Online platforms	20
WhatsApp/Social media	16
Other companies	11
Personal networks	20
Others	5
N	24

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 reported as 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.

Table 3.12 Gains from participating in futures markets

Benefit	First benefit	Second benefit
Price information	8	6
Better price realization	13	6
Risk mitigations	2	11
No Benefit	0	1
Others	1	0
N	24	24

We also asked all the respondents about how they manage price risk irrespective of their status of participation in the futures market. As shown in Table 3.13, a majority reported managing around 10-30% of the price risk whereas 19 believed that they are able to manage less than 10% of the price risk that they face.

Table 3.13 Price risk managed by company

Price risk	Number of respondents
<10%	19
10-30%	42
30-50%	7
50-70%	0
>70%	2
N	70

In what is perhaps the most important indicator of how the CFC suspension affected them in terms of the degrees of affect, as shown in Table 3.14, risk management practices were significantly altered; ability to secure fair prices was also significantly affected; and there was significant disruption of market access and participation. In addition, 19 reported financial stability of their firm as being moderately affected whereas 24 reported being moderately affected in terms of ability to secure stable prices. There were 10 responses indicating no impact across different dimensions.

Table 3.14 Impact of futures suspension on VCPs

	Significantly	Moderately	Slightly	No impact
Financial stability impacted	16	19	10	
Ability to secure fair prices impacted	22	15	5	2
Ability to secure stable prices hindered	11	24	7	3
Market access and participation disrupted	18	15	10	1
Risk management practices altered	24	8	8	4

Note: Multiple responses allowed.

Table 3.15 Ability to access credit and financial resources impacted

	Moderate Improvement	No influence	Moderate negative influence	Significant negative influence
Access credit and financial resources	9	15	4	16

While most participants reported disruptions in various aspects of price discovery and risk management, the impact on access to credit and financial resources appeared more balanced, with responses nearly split between significant negative influence and no influence. The negative impact is likely linked to disruptions in warehouse financing, which certain participants had benefited from during the futures trading period. Exchange-traded commodity derivatives are stored in accredited warehouses, with records maintained efficiently through the repository ecosystem. This system enhances transparency, making it easier for banks to extend credit. In this context, the WDRA could play a crucial role in advocating for the revocation of the suspension on these commodities.

41 respondents suggested the need for capacity building initiatives and support (Table 3.16). While exchanges have several awareness campaigns, there is an inherent problem of awareness and degrees of awareness that needs to be addressed for improving participation. We address this along with qualitative insights offered by key stakeholders.

Table 3.16: Need for capacity building initiatives and support

	Number of VCPs
Yes	41
No	2
Don't Know	2

In what follows, we present some results of our econometric exercise of the survey data to offer insights on hypotheses that were tested and their implications.

3.3.4 Econometric Results

3.3.4.1 Results of probit analysis on perceived impact of the ban

Table 3.17 Participation in commodity derivative market (Probit Model)

Dependent Variable	Commodity market participation
Listed company (Yes=1)	1.710***
	(0.58)
Collective purchasing from farmers (Yes=1)	-1.344*
	(0.70)
Collective purchasing from intermediaries (Yes=1)	1.392*
	(0.72)
Business role (Processor=1)	2.378**
	(1.07)
Business activity (Sourcing and Procurement=1)	-1.301
	(0.90)
Business activity (Packaging=1)	1.141***
	(0.44)
Business activity (Storage=1)	-0.835
	(0.57)
Business activity (Logistics and distribution=1)	0.801
	(0.57)
Constant	-1.306

	(1.11)
N	69
Pseudo R-sq	0.498

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

Table 3.18 Perceived impact of suspension on Operations cost (Probit Model)

Dependent Variable: Increase in cost	Storage cost	Grading cost	Transportation cost	Interest rate	Admin cost	Depreciation	
Commodity market participation (Yes=1)	-0.794*	-0.809*	0.823	0.553	-0.033	-0.647	-0.196
	(0.44)	(0.41)	(0.51)	(0.44)	(0.49)	(0.47)	(0.42)
Listed company (Yes=1)	-0.141	0.634	0.848	0.236	0.622	0.582	1.008**
	(0.47)	(0.51)	(0.54)	(0.42)	(0.45)	(0.46)	(0.44)
Association membership (Yes=1)	-4.771***	-1.225	-6.998***	-0.349	-0.002	0.393	0.691
	(0.60)	(1.11)	(0.76)	(0.83)	(1.10)	(1.03)	(0.88)
Suspension awareness(Yes=1)	-5.818***	-0.497	-4.892***	-0.235	0.406	0.205	-0.238

	(0.44)	(1.16)	(0.51)	(0.84)	(1.10)	(1.03)	(0.93)
Risk management (Long term contract with suppliers and customers (Yes=1)	0.129	0.024	0.731	0.225	1.084**	0.879**	1.134***
	(0.40)	(0.39)	(0.56)	(0.38)	(0.52)	(0.44)	(0.41)
Risk management (Forward contract (Yes=1)	0.19	0.41	-0.723	-0.503	0.306	-0.381	0.602*
	(0.37)	(0.40)	(0.55)	(0.37)	(0.42)	(0.39)	(0.36)
Constant	-0.075	0.911*	1.700**	0.472	-0.358	-0.179	-1.801***
	(0.52)	(0.49)	(0.78)	(0.48)	(0.57)	(0.54)	(0.57)
N	69	69	69	69	69	69	69
Pseudo R-sq	0.10	0.15	0.34	0.06	0.14	0.18	0.19

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

Note: Model of Interest and handling cost is not significant.

Table 3.19 Perceived impact of suspension on credit access, and well-being of operations and suppliers

Dependent var (Positive impact=3, No impact=2, Negative impact=1)	Access to credit and financial resources	Well being of suppliers to company	Company's operations
Commodity market participation (Yes=1)	0.255	-0.052	-0.02
	(0.40)	(0.39)	(0.44)
Listed company (Yes=1)	0.382	-0.281	0.955
	(0.48)	(0.39)	(0.60)
Association membership (Yes=1)	5.340***	1.413***	5.400***
	(0.56)	(0.52)	(0.53)
Risk management (Long term contract with suppliers and customers (Yes=1)	-0.786	1.093**	-1.555***
	(0.50)	(0.47)	(0.55)
Risk management (Forward contract (Yes=1)	0.286	0.814**	0.31
	(0.44)	(0.38)	(0.44)
/			
cut1	5.309***	0.633	6.028***

		(0.52)		(0.50)	(0.63)
cut2	6.455***		1.694***		6.883***
		(0.56)		(0.59)	(0.73)
N		44		44	44
Pseudo R-sq		0.11		0.12	0.21

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

Table 3.20 Perceived impact of suspension on financial stability, risk management, fair and stable prices

Dependent var (Significant negative impact=4, Moderate negative impact=3, Marginal negative impact=2, No impact=1)	Financial stability	Risk management (Hedging)	Fair prices	Stable prices
Commodity market participation (Yes=1)	0.987**	-0.423	-0.439	0.911**
	(0.47)	(0.40)	(0.40)	(0.41)
Listed company (Yes=1)	-1.795**	-1.004	-0.289	-1.328**
	(0.73)	(0.72)	(0.51)	(0.55)
Association membership (Yes=1)	0.583	-0.622	-0.396	-1.512**
	(0.52)	(0.43)	(0.77)	(0.60)
Risk management (Long term contract with suppliers and customers (Yes=1)	0.830*	1.500***	0.795*	1.094**
	(0.46)	(0.42)	(0.44)	(0.51)

Risk management (Forward contract (Yes=1)	-0.349	0.439	-0.106	-0.707
	(0.46)	(0.45)	(0.40)	(0.52)
/				
cut1	-1.146	-2.302***	-1.301	-3.796***
	(0.85)	(0.82)	(0.82)	(0.81)
cut2	0.239	-1.476*	-0.713	-2.870***
	(0.80)	(0.76)	(0.83)	(0.74)
cut3		-0.881	-0.345	-0.927
		(0.72)	(0.83)	(0.71)
N	44	44	44	44
Pseudo R-sq	0.19	0.13	0.06	0.19

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

Note: Fair price model is not significant

3.4. Insights from Key Stakeholder Interactions

Most VCPs were of the opinion that the introduction of commodity futures trading was founded on the grounds that trading enables informational efficiency and leads to efficient price discovery for the market participants. In particular, spot markets are expected to use futures prices as benchmarks. Commodity futures trading is also used for risk management, particularly price risk hedging. However, despite the advantages of commodity futures contracts and benefits that derivative trading offers, regulatory risk is significant. The sustained ban of futures trading of seven agricultural commodities in India since 2021 is a case in point.

Many 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 critical than CFC trading. Many 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.

Upon the request of VCPs, we have anonymized them and used generic pseudonyms.

A knowledgeable stakeholder in the agribusiness industry, **VCP A** informed us that the imports of palm oil, soy oil and sunflower oil in the marketing season of 2023-24 (November-October) have been much lower compared to the 2022-23 season. This decline in imports (which has obvious implications on domestic edible oil prices) has nothing to do with commodity futures trading. Rather the decline in palm oil imports can be attributed to rise in global prices on account of Malaysia and Indonesia's diversion of palm oil for biodiesel production; a fact that many echoed. Major sources of refined soy oil imports for India are Argentina and Brazil whereas Ukraine and Russia are major sources of sunflower oil. Furthermore, in the 2022-23 season, import tariffs were lower and it will continue to be so till the end of March 2025. If imports grow due to lower tariff structure, it is widely felt by respondents 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.**

VCP A suggested that a close examination of the patterns of edible oil inflation and other suspended commodities offer significant insights into whether futures trading was a concern from the inflation point of view or not. The answer is in the negative.

Recommendation of VCP A:

- Any tinkering with the futures market adversely impacts liquidity as in the case of soybean oil futures. The suspension should be lifted
- It is crucial for the exchanges such as NCDEX and MCX to work with associations (both agricultural and commercial).

It is important to understand that not all actors in the commodity value chain are unambiguously against the suspension of all CFCs. Varied reasons and logic emerged from our interactions.

The underlying logic for such a perspective as provided by some VCPs for commodities such as soybean was that soybean futures prices were highly volatile, and traders were speculating and altering the price because of the small Indian soybean market [We cross-check with findings from the data in Chapter 2]. According to them, it caused stability and sustainability issues for processors because high price fluctuations in raw materials created issues in the price discovery of finished refined soy oil.

- **Some VCPs recommend that the ban on futures trading of refined soy oil should be lifted because it is a global market where speculation is difficult. It also provides a safety net for hedgers. However, some suggested a need for caution in lifting the ban on soybean futures. He believes that speculation in soybean futures makes it difficult for processors.**

VCP B is a soy oil processing firm. This single-site operation purchases soybeans from traders and farmers within an 80 km range. The firm has an annual revenue of 16 crore INR, with an annual profit of 4 crore INR. VCP B actively hedged in the futures market to mitigate risk, using 50% of the total commodities handled by the company in the futures market.

The main insights on suspension that VCP B mentioned is echoed by several others who have experience of futures trading. Some of the opinions of VCP B are as follows:

- Futures do not influence inflation; instead, inflation is induced by global market conditions. The rise in soy oil prices was due to stock holding by China during the COVID period, not speculation.

- Since the ban, it has become difficult to manage price risk independently, resulting in increased handling costs, including storage, transportation, and interest costs.

- The ban has impacted the financial stability of the company and hindered market access for hedging and risk mitigation. However, the ban has not impacted securing fair and stable prices or influenced the company's credit access.

- Poultry industry has been facing issues regarding soy feed. Due to the ban on futures trading, issues with prices and availability of raw material is an emergent problem.

- Margins in the global markets are very high, and small firms like his cannot afford them, so they do not hedge in the global market. However, large players are still trading in global futures markets. The upliftment of the ban is very necessary for small and marginal firms.

- **Recommendation of VCP C: Futures trading should be allowed for soy oil because it is a large global market and cannot be altered by speculation.**

Alternative Format/Case: Q & A type as it is to highlight key issues

VCP C has three main roles:

1. Importing and selling edible oils in the local market.

2. Domestic and international trading of commodities.

3. Providing consultancy to large importers.

How do you see the futures suspension?

Suspension is not a forward-looking decision. He thinks that domestic market speculations play only a minor role in inflation, while the global market, climate events, and geopolitical events have a greater influence. He highlighted global events such as

the Russia-Ukraine war, COVID-19, and the blockage in the Suez Canal. There are concerns about drastically changing weather patterns and climate change.

Do you think the effect of the suspension is homogeneous across all firms or varies?

The impact of the suspension is heterogeneous across stakeholders. Big players are still active in the global markets, while small processors and farmers are negatively affected. There is no exit route for small and medium processors to hedge their price risks. However, he also mentioned that processors spread fake news about bumper production to purchase soybeans at low prices. If futures trading were allowed, farmers could get fair prices.

What are the price discovery mechanisms post-suspension?**

Involvement in global trade markets like Malaysia, Chicago, and European markets and gets price information from there. He is also trading in the international market.

What are the major factors causing commodity price volatility?**

Geopolitical and global factors are major contributors to volatility. Climate and weather factors also play important roles in disrupting global supply-demand dynamics. He acknowledges that speculation or trading contributes to inflation but argues that suspension is not the solution. He suggests that delivery mechanisms in futures contracts can reduce the effects of speculation.

What was the average range of price volatility observed before and after the suspension?

The range in price volatility remains more or less similar pre- and post-suspension. He did not see any influence of futures trading on price volatility.

Following the ban on futures contracts, how has the operational management cost changed for your firm?

There has been no impact on operations.

How does your company manage the risk of price fluctuation post-suspension?**

By trading in the global market.

Interview with VCP D

VCP E is an integrated player in the edible oil business with a presence across the entire value chain, from farm to fork. They own multiple manufacturing units that cumulatively

How do you see the futures suspension?

I'm against the suspension of futures trading and believe that it is not a forward-looking decision. I think that domestic market speculations have only a minor role in inflation while global market, climate events, geopolitical events have greater influence. Because of this ban, we are Missing export opportunities.

What do you think about the effect of suspension is homogenous on all firms or in other ways around?

I think the impact of suspension is heterogeneous across stakeholders. Big players are still in the global markets while small processors and farmers are having negative impacts. There is no exit route for small and medium processors to hedge their price risks. He mentioned that suspension has no or little impact on big players because they have alternative tools for risk management but directly and indirectly it is hurting farmers. Farmers are facing issues in price discovery and did not get fair price. If there will be futures trading then farmers can get fair prices.

What are price discovery mechanisms post suspension?

We are involved in global trade markets and get price information from there.

What are major factors causing commodity price volatility?

I believe that geo-political and global factors are major factors for volatility. Climate and weather factors are also important factors for disrupting global supply-demand dynamics. I do not see delivery mechanisms in futures contracts as an appropriate tool to reduce the effects of speculations.

Average range of price volatility observed before and post suspension?

I think the range in price volatility remains more and less similar pre and post suspension. I do not see any influence of futures trade on price volatility. The global factors are major factors for commodities. The volatility is part of trade. You can see it in

the share market, commodity markets of Malaysia, Chicago and UK. Government should not ban it. However, for reducing volatility, the government can put a cap on volatility range or adopt some other measures.

Following the ban on futures contracts, how has the operation management cost has changed for your firm?

I do not see any change in operation management cost, because of use of alternative risk management strategies like Futures trade in global. market, Forward trades, buying Commitments from farmers

How does your company manage the risk of price fluctuation post suspension?

We rely on futures trading in the global market. We also rely on forward trades, buying commitments from farmers for managing price risk fluctuations.

Do you think Indian exchanges have enough liquidity?

NCDEX has enough liquidity for some commodities but for others they do not have. They have liquidity of soyabean but not for refined soya oil.

*Note for NCDEX: There are summaries of at least 10 other VCPs that will be included once we clarify the format of this chapter

3.5 Findings from Meeting with FPOs and Farmer Associations

***We will present the quantitative insights from FPO surveys here. Below we present inference from semi-structured interviews and key stakeholder interactions.**

The insights from FPO representatives in Maharashtra 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, the Risk Mitigation Cell and other similar initiatives can significantly enhance the resilience and sustainability of the agricultural sector in Maharashtra and beyond.

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 at the village chavadi 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 in Maharashtra:

CBBO A operates as a Cluster Based Business Organisation (CBBO) and have successfully promoted 52 Farmer Producer Organizations (FPOs) across six states. While they do not engage in direct commodity trading, their primary focus is on facilitating market connections for these FPOs.

CBBOs play an important role in connecting farmers and FPOs to markets, but they face several significant challenges as follows:

1. Determining the most suitable crops for farmers to cultivate
2. Identifying the optimal timing for selling produce
3. Developing effective strategies to hedge price risks
4. Establishing fair and accurate commodity prices

Insights of CBBOs clubbed together:

Hedging as a Risk Management Tool-

Another FPO representative mentioned that while traditional hedging involves storing grains until market prices rise, it also carries the risk of spoilage and storage costs. Futures trading offers a more sophisticated hedging mechanism, allowing farmers to lock in prices in advance, thus protecting against price volatility. However, the representative emphasized the need for proper education and training for farmers to effectively utilize this tool.

Dependency on Local Newspapers

An FPO leader pointed out the heavy reliance on local newspapers for market information. While these newspapers provide updates on current prices and market conditions, they do not offer insights into futures prices or sophisticated market analysis. This dependency limits the farmers' ability to make informed decisions about futures trading. The representative advocated for the inclusion of futures market information in local publications to bridge this knowledge gap.

Government's Role in Facilitating Transition

A representative highlighted the crucial role of the government in facilitating the transition to futures trading. They appreciated initiatives like the Market Information and Intelligence Cell but pointed out that more targeted efforts are needed to reach rural farmers. The representative suggested that government-led initiatives should include practical training sessions, easy-to-understand educational materials, and local champions who can advocate for the benefits of futures trading within the community.

Skepticism and the Need for Awareness

Several representatives expressed skepticism about commodity derivatives and futures trading. They cited a lack of awareness and understanding among farmers as a significant barrier. These representatives suggested 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.

Traditional Price Discovery vs. Futures Trading

One representative highlighted the stark difference between traditional price discovery methods and futures trading. They explained that, traditionally, farmers rely on local markets and auction systems to determine the prices of their crops. Information about current prices is often sourced from local newspapers and word-of-mouth. Futures trading, however, presents a new paradigm where prices are determined based on future market expectations, which can help stabilize income but requires understanding complex financial instruments.

Price Volatility and Financial Stability

An FPO representative emphasized the challenges posed by price volatility in the agricultural sector. Traditional methods often leave farmers vulnerable to sudden price drops, leading to financial instability. 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. However, the representative stressed the need for accessible training programs to help farmers grasp these concepts.

Potential for Cooperative Models

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.

Traditional Market vs. Organized Trading Platforms

One FPO member noted the comfort and familiarity farmers have with traditional markets. They sell their produce directly to local traders and are wary of organized trading platforms due to a lack of exposure and understanding. The member suggested that creating pilot programs where a few FPOs participate in futures trading could serve as a practical demonstration of its benefits, gradually building trust and familiarity among the farming community.

3.6 Interpretation of Findings from the Field

Based on the interactions with different actors in the commodity value chain across Maharashtra, Madhya Pradesh, and Rajasthan, the following facts are evident.

First, commodity futures contracts (CFCs) **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 indicator of directionality**. For non-participating actors, 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, there is no evidence of increased volatility in agricultural commodity prices following the ban. Nor is the volatility reduced compared to the pre-ban period of interest. 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 Recommendations

4.1 Main Findings

Main findings from Chapter 2 and 3 will be reported here after we receive NCDEX Comments

4.2 Policy Recommendations

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 CFC trading is a dampener for the past market development initiatives in the agri-ecosystem. Several categories of physical market participants indicated that the trust is essential in building confidence in the futures markets and loss of momentum will take time to recover the liquidity in the post-launch period. More importantly, given the lack of statistical evidence on futures trading causing retail inflation as evident from our secondary data analysis, **we strongly recommend the lifting the ban on CFC trading for edible oil and oilseeds.**
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, abrupt suspension of CFCs 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, considerable consultations with the exchanges,

participants and non-participants should be undertaken in the future when temporary suspensions are deemed reasonable.

3. 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 should be seriously evaluated by the government and research community.**
4. For **refined soy oil** and **mustard oil** in particular, the movements of international prices needs to be monitored carefully. The Indian soybean and refined soy market is quite small compared to the global market, accounting for only 100 lakh tons of soybean, which is 2-3% of the global market. While the import of soybean was banned in India at the time of writing, refined soy oil could be imported and exported. Inflationary pressures on edible oils have indeed been a major policy concern, and **in the absence of careful analysis of the effect of international price movements and trade patterns, casting aspersions on the futures trading is not surprising.**
5. For **grains whose prices are inherently linked to the MSP and government's procurement policies, strategies need to take into account the seasonal demand forecasts and monitoring hoarding.**
6. The **participation of farmers and FPOs in the commodity futures markets is low**. Our study suggests that a major barrier to greater participation is awareness about futures markets and limited contracts that are suitable for farmers. Since these challenges are addressed by commodity derivatives platforms, **it is crucial to raise awareness and hope of farmers and FPOs.** We believe that the government should take necessary steps in addressing these critical issues.

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