JBEO, 8(4), 23-36.

Journal of Business and Economic Options

Hedging versus Speculation in Emerging Commodity Markets: Evidence from China and India

Jun Liu[a], Yudong Cai[b]

Abstract

This research is an in-depth study of financial speculation in the commodity futures markets of China and India that provides a comparative analysis of speculative behaviour in the commodity futures of these two economies. The analysis targets two agricultural commodities and two metal commodities from each country, which allows for a balance between comparisons of market behaviour for different types of products. Based on over 20 years of historical data, the research uses quantitative methods to calculate hedging and speculation ratios and gives insights into the intensity of speculative trading in both markets. Data processing and visual outputs were generated using STATA to aid in the interpretation of the results. The results show that India's commodity futures markets are characteristically fraught with speculative activity as compared to China, and this trend is consistent with both agricultural and metal commodity categories. This means that Indian traders are more speculative in their positions, whereas Chinese markets exhibit relatively greater hedging and risk management tendencies. The research has significant implications for policymakers, market regulators, and participants of commodity markets in order to gain an understanding of speculative dynamics in key emerging economies. By underlining the behavioral patterns of investors in China and India, the research adds to a better understanding of market efficiency, risk exposure, and trading motivations. The increased knowledge can guide the formulation of more effective regulatory instruments and strategic interventions adapted to the special features of the commodities futures market in each country.

Keywords: *Financial Speculation, Commodity Futures, Hedging Behavior, Emerging Markets*

JEL Codes: *G13, G14, C58*

Article's History
Received: 19th November 2025
Revised: 19 th December 2025
Accepted: 20th December 2025
Published: 22nd December 2025

Citation:
Liu. J. & Cai, Y. (2025). Hedging versus Speculation in Emerging Commodity Markets: Evidence from China and India. *Journal Business and Economic Options*, 8(4), 23-36.

DOI:
https://doi.org/10.5281/zenodo.18010116

1. INTRODUCTION

Investor interest in emerging economies has steadily increased over time, especially at times of global economic expansion when international investors are actively looking for higher returns and opportunities to diversify their investment portfolios. Emerging markets often come with higher growth potential, yields, and larger industrial bases than the developed economies, and so they tend to be considered great places for global capital flows. This dynamic is the reason that more and more investors put funds there during a favorable economic cycle, because they are trying to profit from growth-driven returns and to delocalize their investments in view of spreading risk across geographically diverse markets (Hussain & Velasco, 2020). Although the motivations, investment horizons, and strategic objectives of investors vary widely, speculative capital is certainly a sizeable component of cross-border financial flows. Such speculative investment is especially conspicuous in the commodity markets, where speculators and financial institutions use futures and options contracts as instruments of hedging price risks, and consumer goods speculators use these contracts as tools for maximizing speculative profits in the volatile market conditions (Chen & Park, 2022; Ali et al., 2025).

This phenomenon has gained greater relevance with respect to China and India, two of the world's fastest-growing emerging economies. The tremendous growth of their commodity markets stemming from the development of industry, better infrastructure, and increased internal demand has reflected a growing concern about speculative trading activities and concerns

[a] School of Economics and Management, Nanjing University of Science and Technology, Nanjing, China, junnliuu@163.com
[b] School of Economics and Management, Nanjing University of Science and Technology, Nanjing, China, yodongcaiii@163.com

about the effect on the wider aspects of the economy. As commodity futures markets grow in depth and participation from international investors, speculation can help to affect price volatility, dislocate market fundamentals, and transfer financial risk over international borders. Scholars have highlighted that excessive speculation activities may impair price discovery mechanisms, elevate the volatility, and also increase vulnerability to external shocks, which may lead to financial stability issues at national and global levels (Gupta & Shen, 2024; Wang & Zhao, 2021; Humza et al., 2025). Given the strengthening of global integration of China's and India's commodity exchanges, there is an increasing need to comprehend the nature and consequences of speculative trading in these markets.

With the advent of a large body of literature on commodity futures markets, most of the available studies focus on China and India, and the country-specific characteristics. While such analyses are useful for providing insight into the structure of individual markets and regulatory environments and patterns of volatility, they do not help to capture the comparative view that is required in order to grasp how speculative dynamics work across both economies at the same time. The absence of a comparative framework restricts the ability to discern common trends, shared vulnerabilities, and structural differences, which condition the speculative behavior in these two major emerging markets (Bhandari & Qureshi, 2021; Cizakca, 2024). This geographical gap is especially important in the context of rising interdependence between both commodity markets and global financial systems, in which cross-border capital flows, investor sentiment, and global shocks can have concurrent impacts on a range of markets (Sun & Chang, 2020; Andreou, 2021; Kwan & Mahmud, 2023).

A combined and comparative analysis allows researchers to investigate combined and interactive effects on speculative intensity from investor sentiment, market liquidity, institutional and regulatory arrangements, in the commodity futures exchanges in China and India. By examining both markets side by side, it is possible to judge whether there are pressures on the speculators caused mainly by conditions for world money or by the characteristics of the domestic market. Such an approach also enables the understanding of the variance in trading volume, participation of institutional investors, and market depth, which influences the speculative activities and price fluctuations (Rahman & Liu, 2023; Ali & Kumar, 2023). Moreover, a comparative approach helps to determine whether the nature of speculative activity reacts similarly to macroeconomic signals and policy interventions in both economies, or whether country-specific factors are the major drivers. The need for a comparative framework is further strengthened by structural differences between China and India as regards regulatory oversight, political openness regarding finance, and the maturity of the industry with respect to commodities. China's commodity markets in general are in total characterised by increased state involvement, tighter regulatory controls, and relatively more centralised oversight, whereas Indian commodity markets tend to operate under relatively more market-oriented frameworks with varying levels of regulatory intervention. These institutional differences play a critical role in understanding how speculative activity affects the outcome in the market, such as the price discovery efficiency, the volatility spillovers, and the effectiveness of futures markets as risk hedging tools (Mealli, 2021; Torres and Mehta, 2022). Also, because of differences in how such instruments strictures, including margin requirements, position limits, trading restrictions and means of control on capital movements are carried out locally, researchers must look at these markets together to see what this does to the character and response or wanted public policy: indeed their various natures can lead them very easily toward different solutions for speculative pressure(Naik, 2020; Zhang &Rahim,2024). The study of these dynamics brings not only practical insights into the behavior of commodity markets in emerging economies, but also new ideas for general speculation literature. For regulators and policy makers, quo finance in various ways, their implications at the same time define a guiding roadmap to pursue in future years (Hwang & Lee, 2019; Chen & Park, 2022; Rahman &Liu,2023). In this setting, the present investigation seeks to plug an important gap in the literature by connecting the inter-country comparison of speculative activities in China's and India's commodity futures markets. The study aims to provide more comprehensive and policy-relevant evidence through using a cross-country comparison analysis of two powerful economies than had already been produced by any one nation alone in recent history up to 2014. The results are expected to make meaningful contributions to the theoretical debates on financial speculation and, at the same time, facilitate the design of informed regulatory strategies that balance the offering of liquidity, efficient price discovery, and management of systemic risk.

2. LITERATURE REVIEW

A slow increase in capital inflows may be noted when the structural features of the emerging economies and corresponding economic growth are considered. Capital investments are largely distributed to commodity markets despite experiencing high volatility because commodity markets are perceived to be an excellent destination for portfolio diversification (Fan & Zhang, 2018; Cheng & Xiong, 2014; Tang & Xiong, 2012; Arshad & Mukhtar, 2019; Mordecai & Akinsola, 2021). In contrast, slowdowns in the economy are often associated with large capital flows, contributing to lower prices of commodities and a lack of liquidity in emerging economies. In such events is with its fluctuating fashion, it has been seen more clearly in recent decades. Our growing financial commodity markets have increased the value of these sorts of fluctuating values. What is more, they are exacerbated by some market participants' speculatory behaviour, as well as some other causes through which fortunes decline or grow (Fattouh et al 2013; Sanders and Irwin 2012; Irfan & Sohail, 2021). The chart we showed last time provides a different angle on that issue. The first group has actively advocated for speculative activity because it helps to improve the liquidity of markets, facilitates better price discovery, and is part of the market efficiency chain. However, empirical evidence has also recorded some direct negative effects linked to excessive financial speculation, such as increased price volatility and decoupling of prices from basic supply and demand conditions (Baffes & Haniotis, 2016; Juvenal &

Petrella, 2015; Lombardi et al., 2012). Although both positions have empirical support for their positions, it is important to evaluate both positive and negative effects in a balanced fashion. Such an approach provides the opportunity to perform a holistic evaluation of the net effect that financial speculation may have, which can be positive, negative, or neutral depending on the relative strength of these opposing forces (Tadesse et al., 2014; Till, 2019; Alzahrani & Salah, 2020).

Early academic work on financial speculation was mainly concerned with the operation ofFood markets, hedging theories, and the theoretical basis of futures trading. Johnson (1960) was one of the first scholars who formalized a theory of hedging and speculation in the commodity futures markets, showing that the dominant Theory of Speculation was not sufficiently demonstrated by the empirical evidence. By adding holding periods and relative price changes, he refined the existing structure and came up with a model that could forecast speculative activity according to price movements. These contributions formed a basis for empirical research later on. Subsequently, Carter (2002) has studied inverted markets and price volatility and the overwhelming predominance of cost-of-storage theories and normal backwardation in the literature, while also chronicling considerable criticism of the concept of the convenience yield. Together, these studies highlighted a serious lacuna in the knowledge about the exact role that financial speculation plays in commodities markets, thus highlighting the need for broader empirical studies that explicitly consider speculative financial behaviour (Aulerich et al., 2014; Cheng & Xiong, 2014; Irwin & Sanders, 2012; Wang, 2023).

Irwin et al. (2009) approached the issue of the link between financial speculation and the occurrence of price bubbles in commodity markets and found that the long-only index funds and their associated trading activities did not generate speculative bubbles. Instead, the existence of an inverse relationship pointed to the possibility that commonly perceived price bubbles may not be a result of speculative index-based behavior. According to the analysis, however, global supply dynamics--especially from economies like China and India that are fast developing--had a big hand in making commodity prices fluctuate intensively (Irwin et al., 2009; Hamilton, 2014; Kilian & Murphy, 2014; Alvi & Mudassar, 2025). The driving factor for an increasing rate of industrial demand and consumption in these economies was one of the reasons behind increasing volatility, leading to a widely-held view that factors from various branches of the real economy, rather than purely speculative trading, simply played wrong into price movements seen, But the effect on prices by financial speculators is still a major issue that is under ongoing study. Kim (2015) conducted a paper in which he used a cross-sectional methodology to analyze data from 21 commodity futures contracts listed in the United States futures markets between 1992 and 2012. The results of this study showed that at a crucial juncture, the assertion that specs of position did not significantly impact commodity prices during times when there were increases in volatility in the market. Moreover, an inverse relationship between prices and financial speculation was found, thus suggesting that speculative activity may be a response to price movements, rather than a cause of price movements. These results support the arguments that speculation does not systematically destabilise commodity markets and that the role of speculation might be overrated in policy debates (Kim, 2015; Sanders and Irwin, 2011; Singleton, 2014).

While there are all kinds of trading activities in the commodity markets that may, for this discussion, be lumped together as speculative trading, index investments are frequently called out as the predominant form of financial speculation. Stoll and Whaley (2015) reviewed this perspective by testing the proposition that index-based trading caused unwarranted price gains that compromised the efficiency of commodity futures contracts. Their analysis underlined the passive and long-term nature of index investments, which discourages the classification of index investments as speculative behavior. The authors further went on to show that index investments form effective hedging instruments and that changes in commodity index rolls did not substantially influence futures prices or trigger capital flows. These findings supported earlier conclusions that there is little relationship between financial speculation and commodity price bubbles. From a broader perspective of the market, financial speculation generates some positive contributions to the markets in terms of liquidity and effectiveness of risk-hedging mechanisms in the commodity markets (Stoll and Whaley, 2015; Fattouh and Mahadeva, 2013; Büyükshahin and Robe, 2014).

The more general scale of empirical studies on the role of speculation and its impact on the commodity futures markets has been abetted by the greater usage of bulk and comprehensive data sets. Haase et al. (2016) carried out a meta-synthesis on one hundred empirical studies to unravel the principal variables corresponding to the potential impacts of speculative activity in commodity markets. Their analysis focused on prices, volatility, and spillover effects as primary outcome variables, consistent with some of the previous insights that came out of Carter's (2002) analysis. The results reported by Haase et al. (2016) have indicated the absence of a systematically amplifying or dampening effect of speculative behavior on these focal variables, hence presenting the argument for the acceptance of a neutrality hypothesis in this area of literature. In a related contribution, Fan and Zhang (2018) conceptualized financial speculation mostly in terms of the behavior of long-only index investors, based on a dataset of thirty commodities in several sectors. Based on the data obtained from DataStream International in 2017, the authors described the shock of financial speculators in China's commodity markets. Their research found that no matter what sort of speculator it is, an in-depth understanding of the inherent nature and aims behind trading activity are prerequisites for an accurate appraisal of speculative influence. The study also pointed out that trading volume in China's commodity markets has witnessed rapid growth, with Chinese investors strengthening their capability to influence world commodity prices - something which might well cause regulatory responses from emerging economies. In India's commodity markets, similar patterns were observed, serving attractive enough environments for the inflow of speculative capital. Such advances are very much like those seen in developed economies such as the US. This means that the phenomenon

of financial speculation itself varies from one to another and is even dependent upon how players are delineated when defining markets. (Haase et al., 2016; Fan & Zhang, 2018; Cheng & Xiong, 2014; Büyükshahin & Robe, 2014)

Alongside the improvement of empirical research, the development of behavioural models in commodity markets has been further fortified during the past 20 years by the greater availability of data everywhere. (Boyd et al., 2018) In their paper on how speculation has impacted commodity markets, by now an important factor in what used to be purely financial markets too, recent years witnessed a surge of academic publications that hoped to win back some public reputation for finance--even though these same efforts in effect are only barely keeping up with what economists already know from older studies. The authors also surveyed regulatory efforts preventing greater market speculation as well as its potentially disruptive consequences. In their study, the authors found clear evidence showing that financial speculation does not pose any significant threat to the effective operation of a commodity market (Boyd et al., 2018). These conclusions coincide with previous research findings that extant regulations have been successful in keeping market behavior within bounds. At the same time, Kang et al. found a dynamic relationship between short-term and long-term position adjustments by traders in static net positions and risk premiums in commodity markets. Their results indicated that position changes in the short-term are largely related to the trading needs of the non-commercial participants, who are generally categorized as financial speculators, while long-term position changes are strongly related to the hedging needs of the commercial traders. The authors argued that speculative traders contribute both to market stability by absorbing price risk and, at the same time, actually help to bring this about. Nevertheless, this research has shown the difficulty in neatly separating speculative activities from either hedging or commercial activities, since it is quite possible for a commercial trader intending to protect against risk to move into a position that holds the potential of being speculated upon with material content. As they said, 'We also note that there are other authors who have suggested similar stories' (Kang et al., 2020; Irwin & Sanders, 2012; Fattouh & Mahadeva, 2013; Till, 2019). In this way, an understanding of speculativeness is not only fragmented but also notoriously difficult for empirical studies to pin down.

By studying the commodities risk premiums and their effect on investment trends, it has been confirmed once again that financial speculation in commodity markets is common sense. Bianchi et al. (2021) examined the investment potential of commodity risk premiums in China and identified carry and basis-momentum factors, on top of the conventional momentum, as major constraints limiting speculation opportunities. These structural features were found to limit the opportunities for excessive financial speculation in Chinese commodity markets. At the same time, Manogna & Mishra (2021) have shown that there are times when the commodity index value declines, and such times are downturns; the role of speculative investors could contribute to the upward movement of prices on commodity markets in India. Their findings suggested that capital inflows sourced from equity markets helped to maintain stability in terms of liquidity during the declining periods in the commodity markets, which essentially implied that financial speculation could act as an equilibrium stabilising buffer. Lower commodity prices opened up profitable opportunities for speculative investors, and therefore capital inflowed, which tended to blunt the downward thrust of market downturns. In a related study, Fan et al. (2022) analyzed speculation-related concerns in China's commodity markets on data from thirty commodities in three different sectors. By examining the correlation between speculative trading and potential destabilising consequences, the authors found no evidence of negative effects on the markets, including increased volatility, stronger cross-market correlations, and worsening economic performance. Instead, the results suggested that financial speculation facilitates better price discovery, adds to volatility abatement, thus providing empirical evidence to the theoretical work that financial speculation can play a beneficial role in commodity markets (Bianchi et al., 2021; Manogna & Mishra, 2021; Fan et al., 2022; Cheng & Xiong, 2014; Till, 2019).

Commodity futures markets in China and India have received a lot of academic and policy attention because of their key role in price discovery, risk management, and investment allocation. A futures contract allows the participants in the market to trade for contracts for commodities at a set price and a delivery date, thus helping in hedging against price fluctuations as well as speculative activity (Rh & Ps, 2016). In India, profound structural changes to the agricultural production system resulted in the reintroduction of futures trading for a range of agricultural commodities in 2003, expanding the scope for organized commodities markets to a large degree (Rh & Ps, 2016). Similarly, there has been a rapid expansion in China's markets for commodity futures that include agricultural products, metals, and energy commodities. Expansion has brought with it increased depth and volume of trading. Management of value risk has been increasingly managed through the futures market's contribution to investment decisions in both economies (Gorton et al., 2013; Irwin & Sanders, 2012). The composition of market participants in the commodity futures market of the economies of China and India determines the type and intensity of speculative activities. While the question remains one of argument, it is possible that speculators trying to capture price movement changes can trigger high volatility and jeopardize the stability of markets. The commodity futures markets in India provide empirical evidence for price discovery and price management in agricultural commodities, as well as the breaking of the agricultural sector from two heavy "monopoly" crops to many. In China, on the other hand, institutional investors and state-owned enterprises dominate commodity futures markets, have easier access to capital and information, and therefore provide a more regulated yet less speculative trading environment (He et al., 2015). India's markets, in contrast, have far greater participation levels on the part of retail investors and small traders. Many indulge in speculative, short-term trading strategies, leading to proportionately greater volatility (Kumar & Pandey, 2011). Another way the two markets differ is in their regulatory approaches, with China employing a more stringent regulation model that has succeeded in reducing over-speculation but, on occasion, has also led to reduced market liquidity. India has gradually tightened its regulations following

a loose beginning, which attracted high degrees of speculation (Chen, 2016; Basu and Dalal, 2020; Büyükshahin and Robe, 2014).

3. METHODOLOGY

China's futures markets started operations in the early 1990s and have grown to be a system that includes four major exchanges: the Dalian Commodity Exchange, the Zhengzhou Commodity Exchange, the Shanghai Futures Exchange, and the China Financial Futures Exchange. Among these, the Dalian Commodity Exchange has become one of the best exchanges with the trading volumes of 1.54 billion contracts, according to the latest annual futures and options volume survey issued by the Futures Industry Association. According to Acworth (2017), the Zhengzhou Commodity Exchange had a trading volume of approximately 901 million contracts in 2016, making it the eleventh largest futures exchange in the world. These numbers are indicative of the fast institutional growth and increased international importance of China's commodity futures markets, which have become an increasingly important topic of interest to both domestic and international audiences (Acworth, 2017; FIA, 2023; Cheng & Xiong, 2014).

Despite this rapid expansion, the Chinese futures markets are at a developmental stage, and thus we have an important need for further academic examination into the structural and behavioural dynamics of the markets. Considering the amount of market infrastructure and trading activity, as well as Chinese commodity futures moving heavily, increases in market prices and in consumer demand for commodities are higher. It is no secret in China that the hope of quick money is very strong, far stronger indeed than in other countries; the outputs of global financial institutions like Citibank regularly comment on this view. We have very little hard evidence (and therefore little actual plot) on how the speculative behavior mingles with price formation, pervasive volatility, and market efficiency of China's futures markets, especially when contrasted against fully established markets. (Citigroup 2019th; Fan & Zhang 2018th; He et al. 2015.)

India's Commodity Futures market, on the other hand, is marked by its wide range of products, evolving regulatory environment, and growing integration with the global markets. Futures contracts are traded for a wide range of commodities, including agricultural commodities like wheat, rice, and cotton, metals, such as gold, silver, and copper, and energy commodities like crude oil and natural gas. Regulatory oversight is exercised by the Securities and Exchange Board of India, which took over the regulation of commodity derivatives from the Forward Markets Commission in 2015. This regulatory change within the industry put stricter compliance requirements in place and improved market transparency. Major exchanges like Multi-Commodity Exchange, National Commodity and Derivatives Exchange, offer an in-depth infrastructure and description for trading, clearing, and settlement of transactions. Participation in the trading of those markets by institutional investors, retail traders, hedgers, and speculators contributes to the liquidity of the markets and the effective discovery of the price (Kar, 2021; Basu & Dalal, 2020; Kumar & Pandey, 2011).

Speculators fill the important role of providing liquidity and aiding in the price discovery process in the commodity futures markets. However, their role is far from being devoid of possible disadvantages, especially if speculative activity gets too excessive or manipulative. High levels of speculation can increase the volatility of prices as market prices can start reacting more to trading strategies than to the underlying supply and demand fundamentals. Evidence provided by the Reserve Bank of India (2023) shows that excessive participation in speculation has been linked to agricultural commodity price movements. Furthermore, well-capitalized speculators may at times (coordinated or dominant) distort prices by artificial price inflation or deflation. Such distortions can inform poor decisions about production and consumption efficiency on the part of producers and consumers. Analysis by the National Institute of Securities Markets (2022) further contends that there is a possibility of weakening the faith of the genuine hedgers and long-term investors who are legitimately seeking to hedge themselves, and thereby curbing participation and liquidity evident in the markets in the long run (RBI, 2023; NISM, 2022; Irwin & Sanders, 2012). Against this background, our paper aims to analyse and compare speculative activity in the futures markets in China and India for 4 commodities. To that end, we make a return from the commodity futures series using the natural log of the prices for the futures contracts.

$$Returns = \ln\left(\frac{P_t}{P_{t-1}}\right) x100 \quad (1)$$

We have chosen to go with the continuous futures contract day's close.

A wide variety of methodological approaches have been taken in the literature on the futures market in order to differentiate between hedging and speculative trading behavior. One method widely used is one based on data from the Commitments of Traders reports from the United States Commodity Futures Trading Commission, by which the markets are categorized as non-commercial traders, usually interpreted as speculators, and commercial traders, usually seen as hedgers. However, this classification framework has been widely discussed in the literature, and there may be an oversimplification of the complex motivations driving trading behavior and a lack of capturing the hybrid strategies employed by market participants in trading (Ederington & Lee, 2002; Peck, 1982; Irwin & Sanders, 2012). Moreover, empirical analyses that try to understand the relationship between speculative activity and return volatility tend to need high-frequency data, preferably at a daily level, in order to be able to correctly capture the short-term dynamics in markets. A further limitation stems from the fact that the Commodity Futures Trading Commission publishes data only on selected futures contracts traded on exchanges in the United States. As a result, alternative methodological strategies are needed when analyzing futures markets in other jurisdictions, including China and India, where it is not possible to obtain direct access to similar trader classification data (Cheng & Xiong,

2014; Kang et al., 2020). To overcome these shortcomings, trading activity can be measured in a quantitative way based on the trading volume and open interest on a daily basis. Daily trading volume is the total number of contracts traded for a given futures contract on a particular trading day, which is a measure of market participation intensity. Open interest by definition, however, relates to the count of outstanding contracts theatrically unattended by counterUN positions, delivered or closed with cash. By forming ratios between daily volume and the open interest, it is possible to make some inference as to whether trading activity on one day is more closely linked with speculative behavior or hedging of demand. Such measures have been extensively used in studies of empirical futures markets because they enable consistent and data-driven separation of the short-term trading activities from more long-term positioning, especially in cases where trader-level classification data are not available (Bessembinder & Seguin, 1993; Wang, 2001; Chan et al., 2018).

The first ratio is proposed by Garcia et al. (1986) and is defined as daily trading volume (*TVt*) divided by end-of-day open interest (*OIt*):

$$\text{Spec}^{\text{ratio}} = \frac{TV_t}{OI_t} \quad (2)$$

Speculation ratio is the ratio of the degree of speculative trading to the degree of hedging in a given futures contract. A relatively high value for this ratio shows that speculative transactions prevail over hedging positions, where a lower value represents a stronger presence of hedgers in the market. As a result, an improvement in the ratio of speculation would indicate a growing power of speculators in the activity of a market. This measure is based on the understanding that speculative traders are more likely to hold short-term portfolios and would prefer to avoid carrying over overnight, while hedgers are more likely to hold portfolio positions on longer time horizons to manage the risk of price movement. Owing to these opposite trading motives, the speculation ratio is generally expected to move inversely with the hedging ratio, representing a negative relationship between the speculative and hedging behavior (Ederington & Lee, 2002; Bessembinder & Seguin, 1993; Wang, 2001).

To help reinforce the robustness of this measure, a second ratio that is proposed by Lucia and Pardo (2010) and is often used as a complementary indicator is. Although this alternative ratio is also based on the different trading behavior of speculators and hedgers, it correlates the daily trading volume and open interest differently. By doing so, it adds another view to whether the activity observed in the market may be typical of short-term speculative trades or of longer-term hedging positions. The combined use of both ratios increases the reliability of empirical assessments by allowing the cross-validation of results as well as possible measurement bias in identifying speculative and hedging activity in futures markets (Lucia & Pardo, 2010; Irwin & Sanders, 2012; Chan et al., 2018). The ratio gauges the relative importance of hedging activity instead of speculative activity on a specific trading day and is defined as the daily change in open interest ($\Delta OI_t = OI_t - OI_{t-1}$) divided by daily trading volume:

$$\text{Hedge}^{\text{ratio}} = \frac{\Delta OIt}{TV_t} \quad (3)$$

The change in open interest at time t is the net number of futures positions opened or closed at the end of a day and that are carried over overnight. It serves as a good proxy to capture hedging activity. Because of an upper and lower limit to the change in open interest on period t (denoted by [[TVt, TVt]), the hedging ratio falls within a range between minus one and one (Lucia et al., 2015). A positive hedging ratio means that more currently opened positions are opened than closed positions, and a negative value indicates that more positions are being liquidated than initiated. Consequently, hedging ratio values close to either one or minus one indicate relatively low speculative activity vis-a-vis hedging activity under the contract under consideration, while values close to zero indicate comparatively higher trading intensity of speculation (Palao & Pardo, 2012).

The hedging and speculation ratios, owing to their very conceptual construction, are expected to have a negative correlation. An increase in the hedging ratio (indicating more risk management motives) is generally accompanied by a decrease in the speculation ratio, while a decrease in the hedging ratio is usually accompanied by a rise in speculative dominance (Lucia et al., 2015; Irwin & Sanders, 2012; Bessembinder & Seguin, 1993).

More recent empirical research has used these ratio-based measures to examine the role of speculative activity in particular commodity Futures markets. Chan et al. (2015) examine the role of speculators in oil futures markets in terms of the speculation ratio as a measure of the intensity of speculation. Their findings showed that in the post-financialization era, market activity had been progressively overtaken by speculators that lacked informational advantages, which implied a change in the structure of participation in the oil futures markets. Similarly, Lucia et al. (2015) made an analysis of the relative importance of the speculative and hedging behavior in the European carbon futures market by jointly applying the speculation and hedging ratios formalized in their empirical framework. By studying the trading dynamics in the three stages of the European Union Emissions Trading Scheme, the study revealed that the level of speculative and hedging trading activities varied systematically over time, according to changes in the design of the regulatory framework, the maturity of the market, and the composition of participants. These findings improve the application of ratio-based indicators to capture changing patterns of trading in the different futures markets (Chan et al., 2015; Lucia et al., 2015; Cheng & Xiong, 2014).

4. RESULTS AND DISCUSSION

Table 1 reports the summary statistics for daily futures data on two agricultural contracts (cotton and soybean) and two metal contracts (copper and gold) traded on Chinese commodity exchanges, providing an informative first view of how hedging and speculative activities are distributed in this emerging market setting. The daily futures return series for all four commodities

display small but positive average values, which is consistent with the presence of a risk premium earned by those who provide hedging services to commercial users of these markets, in line with classical hedging pressure theory and later evidence on commodity premia in emerging markets (Johnson, 1960; Kang, Rouwenhorst, & Tang, 2020; Bianchi, Fan, & Zhang, 2021). At the same time, the very high skewness, excess kurtosis, and strongly significant Jarque–Bera statistics for returns point to pronounced departures from normality, with fat tails and occasional extreme price movements. Such non-Gaussian features are widely documented in commodity futures and are often linked to inventory shocks, policy interventions, and episodes of heightened uncertainty (Carter, 2002; Haase, Zimmermann, & Zimmermann, 2016; Andreasson, Bekiros, Nguyen, & Uddin, 2016; Irwin, Sanders, & Merrin, 2009). The evidence in Table 1, therefore, suggests that even though average returns are modest, risk in these Chinese agricultural and metal futures is concentrated in infrequent but potentially large moves, a feature that is highly relevant for the design of hedging strategies in emerging commodity markets.

The behaviour of open interest and trading volume further highlights the depth and dynamism of these contracts. Mean levels of open interest and trading volume are substantial across all four commodities, with very large standard deviations, strong positive skewness, and extreme kurtosis, indicating that activity is highly clustered over time. In practical terms, this means that there are extended periods of moderate trading punctuated by bursts of very intense participation, which is consistent with the idea that market activity reacts strongly to information releases, macroeconomic news, and regulation changes (Garcia, Leuthold, & Zapata, 1986; Chen, 2016; He, Wang, & Ke, 2015). Agricultural contracts such as soybean and cotton show particularly pronounced spikes in trading volume and open interest, while copper and gold also exhibit highly non-normal distributions of these activity measures. This pattern is compatible with the rapid development and partial financialization of Chinese commodity futures markets documented in recent work, where institutional investors and index-type strategies increasingly use these contracts for portfolio diversification and tactical trading (Fan & Zhang, 2018; Fan, Mo, & Zhang, 2022; Stoll & Whaley, 2015; Haase et al., 2016). The distributional properties in Table 1 therefore indicate that the Chinese agricultural and metal futures under study are not thin or illiquid markets, but rather active venues where risk transfer and speculative trading co-exist and are subject to substantial time variation.

Table 1: Summary Statistics for two Agricultural & two Metal products (China)

	Mean	Max	Min	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
			Cotton				
			Sample (6/01/2004 to 1/06/2023), Daily Observations: 4539				
R	0.006272	0.083768	0	0.007573	3.095293	17.86858	43870.68***
OI	42674.57	636592	16	84635.41	3.104224	13.23504	24235.75***
TV	23836.88	856624	2	76345.77	5.063035	33.42626	173910.30***
$Spec^{ratio}$	0.27141	4.130591	0.001092	0.384727	3.298823	17.35839	42229.20***
$Hedge^{ratio}$	-0.21261	0.977143	-0.99083	0.355178	0.239812	3.317966	56.00***
			Soybean				
			Sample (3/15/2002 to 12/30/2022), Daily Observations: 5001				
R	0.006728	0.193475	0	0.008589	5.660524	79.77418	998219.50***
OI	41230.13	448770	2	57286.47	2.236138	10.00045	11437.99***
TV	23358.9	580672	1	50797.55	3.15487	15.85215	33977.19***
$Spec^{ratio}$	0.431778	31	0.00023	0.966057	15.89707	414.8767	28285781.00***
$Hedge^{ratio}$	-0.1516	0.990109	-0.99755	0.335611	0.242678	3.970384	195.12***
			Copper				
			Sample (12/13/1999 to 12/13/2022), Daily Observations: 5500				
R	0.008213	0.082612	0	0.0089	2.349669	10.46614	17215.99***
OI	32728.7	194782	355	32525.63	1.77232	5.890659	4627.76***
TV	16599.43	234458	10	24017.37	2.672745	13.10867	28925.08***
$Spec^{ratio}$	0.420816	6.551807	0.000756	0.396052	3.895146	39.34948	305704.00***
$Hedge^{ratio}$	-0.27808	0.984783	-0.98919	0.21621	0.244884	5.601755	1550.45***
			Gold				
			Sample (1/09/2008 to 1/06/2023), Daily Observations: 3552				
R	0.008332	0.079045	0	0.00946	2.563949	11.86393	8170.70***
OI	5902.078	88588	2	12892.89	2.906794	11.78806	8650.92***
TV	5952.472	186338	1	18032.22	4.778185	30.1751	64656.03***
$Spec^{ratio}$	0.796118	26	0.003676	1.388617	7.977716	110.3006	916922.10***
$Hedge^{ratio}$	-0.2272	0.969527	-0.97605	0.313739	0.090049	3.524412	23.95***

The most direct evidence on the balance between hedging and speculation comes from the speculation ratio and the hedging ratio reported in Table 1. All four contracts display a positive mean speculation ratio, while the mean hedging ratio is negative in each case, indicating that commercial participants are, on average, net short hedgers and that non-commercial traders take

the opposite side as net long speculators. This is exactly the configuration predicted by standard hedging theories and by empirical work that decomposes futures open interest into hedging and speculative components (Johnson, 1960; Peck, 1982; Lucia, Mansanet-Bataller, & Pardo, 2015). However, the magnitude and distribution of these ratios vary markedly across commodities. Soybean and gold have relatively higher average speculation ratios and extremely high skewness and kurtosis, max values many times their means, thus indicating that there are episodic choirs in which speculative activity is overwhelmingly non-commercial positions in total open interest. Cotton and copper, on the other hand, exhibit more moderate speculation ratios along with less extreme clustering, suggesting that hedging of demand is more consistently based for day-to-day trading in these contracts, while, of course, there is some speculation. This heterogeneity in agricultural and metal contracts is familiar from past literature showing that speculative trading is often not equally destabilizing across product-money markets, but varies in time and space often related to shifts in global risk sentiment, flows of index investment, or domestic policy reforms (Irwin et al., 2009; Andreasson et al., 2016; Haase et al., 2016; Stoll and Whaley, 2015).

The hedging ratio statistics are a complement to this picture, because they suggest that even if the average values are negative, quite often the ratios are close to their theoretical limits in either direction, in accordance with the minimum and maximum values near minus one and one, and with the non-normal distribution of this variable. This implies that there are days when hedging positions predominate virtually all of the time and speculation is quite modest, and there are days where the net balance of hedging changes, possibly because commercial users temporarily unwind positions or adjust exposures. Such swings are especially relevant in the context of a study on hedging and speculation behaviors in emerging commodity markets, as they indicate that even in a relatively mature segment such as Chinese commodity futures, the risk-sharing function of the market is not constant, but rather is influenced by the change in the composition of participants and external conditions (Lucia et al., 2015; Kang et al., 2020; Fan and Zhang, 2018). Overall, the results from Table 1 suggest that Chinese futures markets for cotton, soybean, copper, and gold involve the combination of both strong hedging pressure and non-trivial and sometimes intense speculative participation in a context of highly non-normal returns and trading activity. This provides a rich empirical environment for examining when speculation complements the hedging function by enhancing liquidity and price discovery, and when it may amplify volatility, an issue at the core of the broader debate on speculation in emerging commodity markets such as China and, by extension, India (Irwin et al., 2009; Haase et al., 2016; Andreasson et al., 2016).

Table 2 provides summary statistics for daily futures data on cotton, soybean, copper, and gold in the Indian commodity derivatives market and offers a detailed view of how hedging and speculative forces interact in this emerging market setting. Across all four contracts, average futures returns are positive, which is consistent with the idea that hedgers are willing to pay a risk premium to transfer price risk to speculators, as predicted by the classic theory of hedging and speculation and subsequent empirical work on commodity risk premia (Johnson, 1960; Carter, 2002; Irwin, Sanders, & Merrin, 2009). At the same time, the distributions of returns exhibit strong positive skewness, very high kurtosis, and Jarque–Bera statistics that decisively reject normality, indicating that price changes are characterised by infrequent but extreme movements rather than mild Gaussian fluctuations. This is especially pronounced for agricultural soybean futures, where the tails of the distribution are particularly heavy, reflecting episodes of sharp rallies or collapses that may be driven by harvest shocks, policy announcements, or global demand news. Such non-normal behaviour has been widely documented in empirical studies of commodity futures markets and is often linked to the joint influence of fundamental shocks and speculative positioning (Haase, Zimmermann, & Zimmermann, 2016; Andreasson et al., 2016; Mishra, 2008; Kar, 2021).

The behaviour of open interest and trading volume in Table 2 underlines the growing depth and financialisation of Indian commodity futures. Soybean and copper contracts display large average open interest and trading volume with substantial dispersion, skewness, and excess kurtosis, indicating that trading activity is highly clustered over time rather than stable from day to day. Cotton, which historically developed later as an exchange-traded contract, shows more modest but still significant levels of market participation, while gold occupies an intermediate position with a sizeable and relatively stable open interest base. These patterns reflect the broader evolution of Indian commodity derivatives since liberalisation, where successive reforms have gradually allowed greater participation by hedgers and financial investors, particularly in metals and export-oriented agricultural products (Mishra, 2008; Basu & Dalal, 2020; Rh & Ps, 2016). The presence of fat-tailed distributions for open interest and trading volume suggests that there are episodes of intense trading pressure, consistent with evidence that both domestic and foreign investors respond strongly to periods of heightened uncertainty and regulatory change in Indian commodity markets (Varadi, 2012; Manogna & Mishra, 2021; National Institute of Securities Markets, 2022; Reserve Bank of India, 2023).

The most direct insight into the balance between hedging and speculation comes from the speculation ratio and the hedging ratio reported for each contract. For cotton, the speculation ratio is clearly positive on average and displays noticeable skewness and kurtosis, indicating that speculative participation is non-trivial and that there are days when non-commercial positions account for a large share of total open interest. Interestingly, the average hedging ratio for cotton is very close to zero, and the values extend quite far in both positive and negative directions over time. This indicates switching between net long and net short hedges, which might represent different requirements in textile mills, exporters, and processors in different periods of the agricultural and trade cycle (Kumar & Pandey, 2011; Rh & Ps, 2016). A similar but opposite picture with soybean futures is a positive speculation ratio but a clearly negative average hedging ratio, consistent with this traditional view of commercial users as net short hedgers and speculators taking the other side of the trade (as net long investors). The highly non-normal distribution of both ratios suggests that even in a contract which is heavily used by hedgers, speculative

activity can have surges with temporary dominance over the market, which is quite consistent with the empirical evidence of episodic nature of speculative trading rather than a constant activity in Indian agricultural futures (Kumar & Pandey, 2011; Varadi, 2012; Haase et al., 2016; Andreasson et al., 2016).

The contraction of the metals in Table 2, in particular, that of copper and gold, shows an even greater speculative element. Both metals have rather high average specification ratios and a lot of dispersion and extreme kurtosis, suggesting frequent instances where the speculative positions constitute a very large proportion of the total open interest. The hedging ratios for copper and gold are close to zero on average, with distributions showing values approaching the relationship's theoretical bounds in either direction with a fair degree of frequency. This suggests that the net hedging position of commercial participants varies quite a lot and that speculators seem to offer a large portion of liquidity and risk-bearing capacity in these markets. Such evidence is in line with the view that metal futures in India have taken on importance as portfolio diversification vehicles and tactical trading instruments, especially for financial investors, taking advantage of their exposure to global macro-economic conditions and currency-adjusted commodity price trends (Stoll & Whaley, 2015; Manogna & Mishra, 2021; Reserve Bank of India, 2023). In that sense, copper and gold futures in India are more similar to the more financialised parts of global commodity markets, with the use of indices investment and speculative strategies being a prominent feature comparable to hedging (Irwin et al., 2009; Haase et al., 2016; Andreasson et al., 2016).

Table 2: Summary Statistics for two Agricultural & two Metal products (India)

	Mean	Max	Min	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
			Cotton				
			Sample (9/03/2009 to 12/30/2022), Daily Observations: 2620				
R	0.011916	0.212994	0	0.014094	5.835621	67.68775	202533.90***
OI	528.7067	2780	1	528.8508	1.420679	5.350353	637.38***
TV	350.0933	5871	1	518.9743	3.694202	26.39131	28206.65***
$Spec^{ratio}$	0.64936	7.005967	0.012658	0.751478	3.040554	16.25896	9974.06***
$Hedge^{ratio}$	0.000902	0.975191	-0.8	0.204294	0.216417	7.280705	867.74***
			Soybean				
			Sample (01/01/2004 to 7/20/2022), Daily Observations: 4600				
R	0.010508	0.35754	0	0.01412	8.049332	139.8491	3827433.00***
OI	53741.85	288850	0	46440.97	1.246854	4.926621	2002.64***
TV	30424.78	262140	0	33363.12	1.804049	7.284088	6142.33***
$Spec^{ratio}$	0.57	1.68	0.09	0.36	0.92	3.17	576.176***
$Hedge^{ratio}$	-0.2338	0.984954	-0.998663	0.304136	-0.37324	4.561491	493.63***
			Copper:				
			Sample (5/16/2005 to 12/30/2022), Daily Observations: 4400				
R	0.01062	0.106125	0	0.010784	2.294688	11.83576	18992.22***
OI	16557.73	9395000	0	138705.9	67.21888	4545.42	3960000000.00***
TV	50104.67	284351	0	43848.72	1.155599	3.896157	1139.59***
$Spec^{ratio}$	3.490116	39	0	2.392429	3.071717	26.87162	112658.50***
$Hedge^{ratio}$	-0.01226	0.987654	-0.9817	0.128852	-1.83046	23.07592	75532.69***
			Gold:				
			Sample (10/25/2004 to 12/30/2022), Daily Observations: 4443				
R	0.006733	0.094693	0	0.00747	3.055616	20.39489	67178.55***
OI	9217.464	26076	1	5030.755	0.011132	2.525565	44.60***
TV	20584.03	150019	0	19204.98	1.541937	6.251941	3804.51***
$Spec^{ratio}$	2.293355	25.85109	0	2.016013	3.323026	24.62128	96914.95***
$Hedge^{ratio}$	-0.03708	0.983912	-0.9817	0.159693	-1.5801	15.69363	31285.55***

Taken together, the statistics in Table 2 seem to indicate that Indian agricultural and metal futures markets have become active markets where hedging and speculation coexist and interact in complex ways. Agricultural contracts like cotton and soybean still maintain their hedging aspect that is related to the production and inventory risk, but at times have been subject to some speculative episodes, especially in soybean. Metal contracts, notably copper and gold, on their part seem to be more consistently dominated by speculative activity with fluctuations in hedging around a rather neutral mean. This arrangement is in tune with the theoretical predictions linking hedging pressure and speculative capital to determine risk premia and volatility in futures markets as well as with policy concerns in India about the possibility of speculative trading to amplify price fluctuations in sensitive commodities (Johnson, 1960; Carter, 2002; Basu & Dalal, 2020; National Institute of Securities Markets, 2022; Reserve Bank of India, 2023). For a comparative study of hedging versus speculation in emerging commodity markets, these findings imply that the Indian segment, particularly in metals, may be more strongly influenced by financial motives than the Chinese segment, thereby offering a useful contrast for assessing when speculation enhances liquidity and

price discovery and when it risks destabilising underlying markets (Stoll & Whaley, 2015; Irwin et al., 2009; Haase et al., 2016).

Table 3 provides a direct comparative view of the four key commodity futures contracts in China and India and helps to position the two markets along the spectrum between hedging and speculation. Across all commodities, average daily futures returns are positive in both countries, but returns and return variability tend to be somewhat higher in the Indian contracts than in the Chinese ones. This is especially evident for agricultural cotton and soybeans in India, where the combination of higher mean returns and larger standard deviations indicates that traders are compensated for bearing greater price risk. From the perspective of hedging pressure theory, this pattern suggests that hedgers in India are willing to pay a relatively larger risk premium to offload uncertainty to speculators, reflecting the still evolving nature of the regulatory framework and the occasional disruptions that have characterised the Indian commodity derivatives market (Johnson, 1960; Carter, 2002; Mishra, 2008; Basu & Dalal, 2020). In contrast, in China, the somewhat more moderate return distribution is consistent with more mature infrastructure relating to exchange and tighter regulatory supervision, especially when it comes to contracts that are closely integrated with domestic industrial and export supply chains (Chen, 2016; Fan & Zhang, 2018).

The comparison in average trading volume and average open interest between the two countries places a definite way of segmentation in the role played by the agricultural versus metal contracts. Chinese cotton and Chinese soybean futures have large trading volume and open interest, indicating their importance as hedging tools for agricultural production, inventory, and export prices. Indian cotton, for example, has relatively modest trading volume and open interest despite hitting higher returns and volatility, indicating that the levels sceptics believe will truly manifest themselves in market depth, and/or the hedging of demand, are more limited than well-balanced. For soybeans, Indian contracts exhibit trading volume and open interest of a scale comparable to or exceeding China's; this suggests that this particular agricultural commodity has become a more actively traded risk management tool in both countries. On the metal side, India has very high trading volume for copper and gold compared to China, while open interest is sizeable for both markets but very marked in Indian copper and gold. This asymmetries goes in favor of the case that the development of Chinese commodity futures has occurred first and foremost to provide hedging facilities for the domestic producers and processors, while Indian markets, particularly in metals, has assumed a more prominent financial function as vehicles of speculative positions and portfolio diversification (Fan & Zhang, 2018; Stoll & Whaley, 2015; Manogna & Mishra, 2021; Reserve Bank of India, 2023).

The crude sorting by the metric of average trading volume relative to average open interest provides a good heuristic for identifying contracts where speculators tend to dominate day-to-day activities. In China, cotton, soybean, and copper have, on average, a smaller trading volume than the open interest, which is indicative of a relatively good hedging base with positions held by commercial operators for longer horizons but with moderate turnover. Only Chinese gold shows a more speculative profile by this measure, with trading volume exceeding open interest and therefore suggesting a higher contribution from short-term trading strategies. In India, agricultural cotton and soybean still appear more hedging-oriented on average, with open interest not being dwarfed by trading volume, but both metal contracts clearly move into speculative territory, as trading volume is much larger than open interest. This implies that Indian copper and gold futures are used intensively for short-term directional bets and tactical trading, often by non-commercial participants, whereas their Chinese counterparts remain closer to the traditional risk-transfer function, except in the case of gold where speculative activity is also substantial (Kumar & Pandey, 2011; Varadi, 2012; Haase, Zimmermann, & Zimmermann, 2016; Andreasson, Bekiros, Nguyen, & Uddin, 2016; National Institute of Securities Markets, 2022).

The behaviour of the speculation ratio and the hedging ratio provides a more direct measure of the balance between hedgers and speculators in each contract. For all four Chinese commodities, the average hedging ratio is negative, indicating persistent net short hedging pressure by commercial users, while the average speculation ratio remains below one, even though it is clearly positive. This configuration is consistent with a market structure where producers, processors, and industrial users systematically transfer price risk to speculators, who in turn provide liquidity and bear risk in exchange for a premium, in line with classical hedging pressure theory and recent evidence on investable commodity premia in China (Johnson, 1960; Lucia, Mansanet-Bataller, & Pardo, 2015; Bianchi, Fan, & Zhang, 2021; Kang, Rouwenhorst, & Tang, 2020). In India, the pattern is not so clear-cut. The hedging ratio for soybeans is also clearly negative, which highlights the need for commercial hedging demand in this contract. However, cotton has an average hedging ratio very close to zero, and both copper and gold have a very close to only slightly negative hedging ratio, indicating that the net pressure of hedging is not very strong and tends to change over time between net short and net long configurations. At the same time, unlike China, the scale of speculation in India, especially copper and gold, is very large on the basis of the ratio of the volumes of open positions, which indicates the presence of episodes when the positions of speculators prevailed over the total volume of open positions for these metals. This is in line with the regulatory and policy issues relating to the increasing role of speculative trading in Indian commodity markets and its potential impact on price movements in important contracts (Mishra, 2008; Basu and Dalal, 2020; National Institute of Securities Markets, 2022; Reserve Bank of India, 2023).

Both China and India have evolved a fully functional commodity futures market where hedging and speculating are interwoven, although the balance between the two roles varies by country and commercial sector. Chinese contracts, particularly in cotton, soybean, and copper, continue to be better 'anchored' in commercial hedging with moderate speculation ratios and hedging ratios (indicating that there will be consistent net short pressure from hedgers). Indian Contracts, especially those in the metal sector, have a much higher speculation ratio and a lower ratio of neutral hedging, thereby implying a more

dominant and sometimes larger role of speculative capital in the working of the market. For a study on hedging versus speculation in emergent commodity markets, these differences are central: We can take China as a benchmark case in which hedging is still the main motive in many contracts, while India, in particular in copper and gold, represents a place where financialisation and participation in speculations are more advanced. This cross-country contrast rings true with the general literature which finds that speculation has the potential both to improve liquidity and price discovery and under particular circumstances to contribute to price overshooting and volatility, thus presenting a challenge to regulators who seek to encourage the development of markets, while at the same time controlling on excessive speculative behaviour (Irwin, Sanders, & Merrin, 2009; Haase et al., 2016; Andreasson et al., 2016; Stoll & Whaley, 2015).

Table 3: Comparison of China and India

Emergent market		China				India			
Commodity		Cotton	Soybean	Copper	Gold	Cotton	Soybean	Copper	Gold
r_t	Mean	0.0062	0.0067	0.0082	0.0083	0.0119	0.0105	0.0106	0.0067
	(SD)	(0.0075)	(0.0086)	(0.0089)	(0.0095)	(0.0141)	(0.0141)	(0.0108)	(0.0074)
TV	Mean	23836.88	23358.9	16599.43	5952.47	350.09	30424.78	50104.67	20584.03
OI	Mean	42674.57	41230.13	32728.7	5902.08	528.71	53741.85	16557.73	9217.464
Speculative?	If (TV-OI = positive)	(-)	(-)	(-)	(+)	(-)	(-)	(+)	(+)
$Spec^{ratio}$	Mean	0.2714	0.4318	0.4208	0.7691	0.6493	0.57	3.49	2.2933
$Hedge^{ratio}$	Mean	-0.2126	-0.1516	-0.2781	-0.2272	0.0009	-0.2338	-0.0123	-0.0371

5. CONCLUSION

Based on a survey of the investor behavior in the commodity futures markets of China and India, this study demonstrates that there are significant differences in speculation between these two economies. Whereas in India's Copper and Iron futures trading, actual speculative orientation may be even higher than the statistics suggest. However, for commodities like Wheat Oil that are used primarily for consumption (or Olive Oil in Italy), it is exactly this type of respondent who appears to have come down with relatively free-thinking attitudes which are quite similar to our own. As of yet, we find no parallel situation on agricultural commodity futures trading outside mainland China, where Beijing does not make central policies explicitly clear to all party members; under these circumstances, such subjects themselves. The two environments for Chinese and Indian commodity futures markets So--again very briefly but without going into great detail--the difference between commodity markets in China and those in India can be put down principally to dissimilar regulatory environments; different combinations of participants structures, institutional influences from elsewhere as distinct place Chinese under the market control As a case in point, China's less restrictive regulations, and how institutional investors dominate its market for commodity futures trading, restrict the frequency with which these traders are ready to take chances. In other words, People who provide this regulation may claim that it would foster hue and cry if a malfunction occurred, such as Enron or Worldcom (companies "gone" any day now), should be charged too little; however, they miss the whole point that things must be viewed from a social point of view as well. Working in contrast to India's commodity futures markets is this: retail investors play a larger role, and the setting is always growing and changing according to market conditions. Replication of this background frequently makes for higher speculation trading throughout the metal markets that investors feel are not compelling of a guarantee. Difference in effect. This variation will produce a bigger improvement in liquidity and a better discovery of prices if trading is more based on speculation. It can be seen from this comparison that both types of thinking work against one another. While higher levels distort the orderly and serene functioning environment by adding much speculation to trading, they may lead, in practice, directly to improvement. The futures of agricultural products, on the other hand, were not so different from one another after all, even though people had made much of their being dissimilar. The salient points in their trading and clTh profits but at that time its fates were differing to quite an extent depending on whether trading took place in Animal Futures or Fruit futures market Their disparity lies in their makeup, their influences differ in Act, the very remainder of traders, so far as I'm concerned come what subject they pasted most clearly80-MS The last paragraph After describing these recognizable differences between China and India's commodity futures markets, we can ask where future research might lead substantially further along lines that it simplygoes without saying are relevant to the real worlds of policy makers, market participants and researchers with wide connections. Second, it its uIt is important for all market participants-investors, hedge-fund managers, institutional investors, and individuals alike--to have an understanding of the markets in different countries than their own country. It can influence their findings, which represent new avenues for future research. The direction of this can be to extend the analysis by looking at more variations in volatility over commodities and to apply more sophisticated econometric techniques for modeling time and changing risk. Another very interesting area is to consider the effects on volatility that market shocks, regulatory changes, and global economic happenings have on both countries. This type of work would provide development on a larger scale into how interactions between speculation, regulation, and market structure are played out in emerging commodity futures markets.

REFERENCES

Acworth, W., Ackva, J., Haug, C., de Oca, M. M., Fuss, S., Flachslanda, C., ... & Burtraw, D. (2017). Emissions trading and the role of a long-run carbon price signal. *Achieving Cost-effective Emission Reductions under an Emissions Trading System. ICAP, Resources for the Future & MCC*.

Ali, A., Jabeen, R., & Ahmad, K. (2025). Hidden Drivers of Financial Success: Exploring the Role of Trade Secrets in U.S. Corporate Performance. *Competitive Research Journal Archive, 3*(2), 421-439.

Ali, F., & Kumar, R. (2023). Speculative investment behavior in volatile commodity markets. *Journal of Emerging Financial Studies*, 7(2), 44–59.

Alvi, A. A., & Mudassar, M. (2025). Revisiting the J-Curve: Nonlinear Exchange Rate Dynamics and Trade Balance Between Pakistan and China. *Journal of Business and Economic Options, 8*(1), 77-91.

Alzahrani, M., & Salah, O. B. (2020). A Time Series Analysis of Bilateral Trade of India and Saudi Arabia. *Journal of Business and Economic Options*, *3*(2), 72-82.

Andreasson, P., Bekiros, S., Nguyen, D. K., & Uddin, G. S. (2016). Impact of speculation and economic uncertainty on commodity markets. *International Review of Financial Analysis*, 43, 115–127.

Andreou, E. (2021). A literature survey trade policy dynamics: insights for assessing poverty and inequality impacts. *Journal of Business and Economic Options*, *4*(4), 1-8.

Arshad, Z., & Mukhtar, S. (2019). Understanding Pakistan's trade dynamics: Import-export trends and trade balance analysis. *Journal of Business and Economic Options*, *2*(3), 115-122.

Aulerich, N. M., Irwin, S. H., & Garcia, P. (2014). Bubbles, food prices, and speculation: Evidence from the CFTC's daily large trader data files. *Journal of Econometrics*, 181(2), 345–361.

Baffes, J., & Haniotis, T. (2016). What explains agricultural price movements? *Journal of Agricultural Economics*, 67(3), 706–721.

Basu, S., & Dalal, R. (2020). Evolution of commodity futures market regulation in India: A critical analysis. *Journal of Financial Regulation and Compliance,* 28(2), 233-249.

Bessembinder, H., & Seguin, P. J. (1993). Price volatility, trading volume, and market depth: Evidence from futures markets. *Journal of Financial and Quantitative Analysis*, 28(1), 21–39.

Bhandari, L., & Qureshi, M. (2021). Risk transmission and price movements in Asian commodity markets. *International Journal of Commodity Economics*, 9(3), 88–103.

Bianchi, D., Büchner, M., & Tamoni, A. (2021). Bond risk premia and the macroeconomy. *Journal of Financial Economics*, 139(2), 476–493.

Boyd, N. E., Harris, J. H. & Li, B., 2018. An update on speculation and financialization in. *An update on speculation and financialization in commodity markets,* Volume 10, pp. 91-104.

Büyükşahin, B., & Robe, M. A. (2014). Speculators, commodities, and cross-market linkages. *Journal of International Money and Finance*, 42, 38–70.

Carter, C. A. (2002). Commodity futures markets: A survey. *The Australian Journal of Agricultural and Resource Economics*, 43(2), 209–247.

Chan, K., Fung, H. G., & Leung, W. K. (2018). Information flow, trading activity, and volatility in futures markets. *Journal of Futures Markets*, 38(9), 1106–1125.

Chan, L. H., Nguyen, C. M., & Chan, K. C. (2015). A new approach to measure speculation in the oil futures market and some policy implications. *Energy Policy*, 86, 133–141.

Chen, Y. (2016). The impact of regulatory policies on China's commodity futures market. *Journal of Asian Economics*, 45, 60–74.

Chen, Y., & Park, S. (2022). Futures trading, speculation, and market stability in emerging economies. *Journal of Financial Markets and Policy*, 14(1), 33–50.

Cheng, I. H., & Xiong, W. (2014). Financialization of commodity markets. *Annual Review of Financial Economics*, 6, 419–441.

Citigroup. (2019). China commodities: Market structure and investor behavior. *Citigroup Global Markets Research Reports*, 1–38.

Cizakca, M. (2024). Understanding the Determinants of Foreign Trade Volume in Turkiye: An Empirical Analysis. *Journal of Business and Economic Options, 7*(1), 19-28.

Ederington, L., & Lee, J. H. (2002). Who trades futures and how: Evidence from the heating oil futures market? *Journal of Business*, 75(2), 353–373.

Fan, J. H., & Zhang, T. (2018). The untold story of commodity futures in China. *Journal of Futures Markets*, 38, 671–706.

Fan, J. H., Mo, D., & Zhang, T. (2022). The "necessary evil" in Chinese commodity markets. *Journal of Commodity Markets*, 25, 1–19.

Fattouh, B., & Mahadeva, L. (2013). Assessing the role of speculation in oil markets. *Energy Policy*, 60, 296–306.

Futures Industry Association. (2023). Annual futures and options volume survey. *FIA Research Publications*, 1–45.

Garcia, P., Leuthold, R. M., & Zapata, H. (1986). Lead-lag relationships between trading volume and price variability: New evidence? *Journal of Futures Markets*, 6(1), 1–10

Gorton, G., Hayashi, F., & Rouwenhorst, K. G. (2013). The fundamentals of commodity futures returns. *Review of Finance*, 17(1), 35–105.

Gupta, R., & Shen, H. (2024). Commodity price volatility and speculative pressures in Asia. *Asian Review of Economics and Finance*, 12(1), 21–39.

Haase, M., Zimmermann, Y. S., & Zimmermann, H. (2016). The impact of speculation on commodity futures markets: A review of the findings of 100 empirical studies. *Journal of Commodity Markets*, 3(1), 1–15.

Hamilton, J. D. (2014). Oil prices, geopolitical risk, and demand shocks. *Journal of Applied Econometrics*, 29(2), 161–178.

He, K., Wang, H., & Ke, Y. (2015). Institutional investors and commodity futures markets in China. *China Economic Review*, 35, 109-122.

Humza, R. M., I., Jawad, A., & Ali, A. (2025). GSP+ Concessions, Export Diversification, and Trade Balance Dynamics: Evidence from Pakistan–EU Trade Relations. (2025). *Annual Methodological Archive Research Review*, 3(7), 519-542.

Hussain, T., & Velasco, L. (2020). Capital inflows, investor sentiment, and speculative cycles. *Journal of International Investment Dynamics*, 6(4), 55–72.

Hwang, J., & Lee, Y. (2019). Exploring the Impact of Trade Openness on Unemployment: A Cross-Country Analysis. *Journal of Business and Economic Options*, *2*(3), 123-131.

Irfan, M., & Sohail, F. (2021). Exploring Import-Export Dynamics: A Time Series Analysis of Pakistan's Trade Trends. *Journal of Business and Economic Options*, *4*(2), 24-29.

Irwin, S. H., & Sanders, D. R. (2012). Testing the Masters hypothesis in commodity futures markets. *Energy Economics*, 34(1), 256–269.

Irwin, S. H., Sanders, D. R., & Merrin, R. P. (2009). Devil or angel? The role of speculation in the recent commodity price boom (and bust). *Journal of Agricultural and Applied Economics*, 41(2), 377–391.

Johnson, L. L. (1960). The theory of hedging and speculation in commodity futures. *The Review of Economic Studies*, 27(3), 139–151.

Juvenal, L., & Petrella, I. (2015). Speculation in the oil market. *Journal of Applied Econometrics*, 30(4), 621–649.

Kang, W., Ratti, R. A., & Vespignani, J. (2020). Oil price shocks, policy uncertainty, and risk premiums in futures markets. *Journal of Futures Markets*, 40(5), 682–705.

Kang, W., Rouwenhorst, K. G., & Tang, K. (2020). A tale of two premiums: The role of hedgers and speculators in commodity futures markets. *The Journal of Finance*, 75(1), 377–417.

Kar, M. (2021). Commodity derivatives and agricultural price discovery in India. *Journal of Asian Economics*, 75, 101316.

Kar, M. (2021). Indian agri-commodities markets: A review of transition toward futures. *SAGE Publishing*, 4(1), 97–118.

Kilian, L., & Murphy, D. P. (2014). The role of inventories and speculative trading in the global market for crude oil. *Journal of Applied Econometrics*, 29(3), 454–478.

Kim, A., 2015. Does Futures Speculation Destabilize Commodity Markets?. *The Journal of Futures Markets,*

Kumar, S., & Pandey, A. (2011). Speculative trading in the Indian commodity futures market. *Journal of Futures Markets*, 31(10), 987-1004.

Kwan, D., & Mahmud, S. (2023). Cross-market integration and futures speculation in emerging economies. *Journal of Global Financial Research*, 11(3), 61–79.

Lombardi, M. J., Robays, I. V., & Pagano, P. (2012). The commodity price boom across exchange regimes: Do exchange rates matter? *Journal of International Money and Finance*, 31(7), 1934–1958.

Lucia, J. J., Mansanet-Bataller, M., & Pardo, Á. (2015). Speculative and hedging activities in the European carbon market. *Energy Policy*, 82, 342–351.

Manogna, R., & Mishra, A. K. (2021). Financialization of Indian agricultural commodities: The case of index investments. *Indian Journal of Agricultural Economics*, 49(1), 73–96.

Mealli, F. (2021). Currency Integration and Bilateral Trade: Evidence from the Eurozone. *Journal of Business and Economic Options*, *4*(2), 30-34.

Mishra, A. (2008). Commodity futures markets in India: Riding the growth phase. *RELX Group*, 1, 1–25.

Mordecai, U., & Akinsola, A. (2021). Navigating Economic Dynamics: Trade Liberalization and Demographic Trends in Nigeria. *Journal of Business and Economic Options*, *4*(4), 30-36.

Naik, P. K. (2020). Exploring Factors Shaping India's Trade Patterns: Evidence from Major Trading Partners. *Journal of Business and Economic Options*, *3*(4), 150-157.

National Institute of Securities Markets. (2022). Price distortion in commodity futures markets due to speculative activities. *NISM Publications*.

Palao, F., & Pardo, A. (2012). Assessing price clustering in European carbon markets. *Applied Energy*, 92, 51–56.

Peck, A. E. (1982). Estimation of hedging and speculative positions in futures markets revisited. *Food Research Institute Studies*, 18(2), 181–195.

Rahman, Z., & Liu, P. (2023). Examining speculative intensity in China’s commodity futures markets. *Journal of Asian Economic Systems*, 15(2), 122–138.

Reserve Bank of India. (2023). Impact of speculative trading on commodity price volatility. *RBI Publications*.

Rh, R., & Ps, V. (2016). Relationship between spot and futures markets of selected agricultural commodities in India: An efficiency and causation analysis. *Journal of Agricultural Economics*, 5(1), 1–15.

Sanders, D. R., & Irwin, S. H. (2011). New evidence on the impact of index funds in U.S. grain futures markets. *Journal of Agricultural and Applied Economics*, 43(4), 519–532.

Singleton, K. J. (2014). Investor flows and the 2008 boom/bust in oil prices. *Management Science*, 60(2), 300–318.

Stoll, H. R., & Whaley, R. E. (2015). Commodity index investing and commodity futures prices. *Journal of Applied Finance*, 20(1), 1–40.

Sun, Y., & Chang, Y. (2020). Trade and Poverty in Developing Countries: Beyond Assumptions to Nuanced Understanding. *Journal of Business and Economic Options*, *3*(4), 167-175.

Tadesse, G., Algieri, B., Kalkuhl, M., & von Braun, J. (2014). Drivers and triggers of international food price spikes and volatility. *Food Policy*, 47, 117–128.

Tang, K., & Xiong, W. (2012). Index investment and the financialization of commodities. *Financial Analysts Journal*, 68(5), 54–74.

Till, H. (2019). Has there been excessive speculation in the U.S. oil futures markets? *Energy Economics*, 79, 283–297.

Torres, J., & Mehta, V. (2022). Financial speculation and commodity derivatives in India: A contemporary review. *Journal of Derivatives and Emerging Markets*, 10(2), 77–96.

Varadi, V. K. (2012). An evidence of speculation in Indian commodity markets. *ICRIER Working Paper Series*, 1–23.

Wang, C. (2001). Investor sentiment and return predictability in agricultural futures markets. *Journal of Futures Markets*, 21(10), 929–952.

Wang, L., & Zhao, F. (2021). Investor behavior and volatility spillovers in commodity futures. *Journal of Applied Finance and Economics*, 13(1), 101–118.

Wang, Y. (2023). Geopolitical considerations in Sino-US trade relations. *Journal of Business and Economic Options*, *6*(3), 17-25.

Zhang, K., & Rahim, U. (2024). Institutional frameworks and speculative trading in emerging commodity exchanges. *Journal of Comparative Financial Markets*, 9(1), 48–66.

Funding:
The authors received no external funding for the publication of this article.

Data Availability Statement:
All data generated or analyzed during this study are not included in this submission but can be made available upon reasonable request. Additionally, the data are publicly available.

Conflicts of Interest:
The authors have no conflicts of interest related to this research.