Commodity Market Flexibility: Commodity Financialization & Mechanism of Price Discovery

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The food crisis during the global financial crisis of 2008 elevated global concerns regarding futures trading behaviour of the financial market participants. The informational spillover across global commodity futures market has been limited. The contemporaneous relations between energy and agricultural futures markets during recent times have been attributed as the reason for price volatility in agricultural futures markets. Apart from that the changing mix of participant positions or financialization of the futures market has been linked to diminishing hedging mechanisms and increasing speculative behaviour.

Keywords: Commodity Futures, Financialization, Price Discovery.

Introduction

Co-movement of returns or return spillovers is first-moment interdependencies, while (conditional) volatility spillovers that are related to risk count as second-moment inter-dependencies. Irwin and Sanders (2012) observe largely unrelated regressions and the limited result of Granger causality from index trading to returns (Irwin and Sanders, 2012). Certainly, if the volumes are large there are generally higher levels of volatility exist and small falls in volatility can prove to be significant in some scenarios (Sanders and Irwin, 2010) and Etienne (2015) (Etienne *et al*., 2015; Sanders *et al*., 2010).

Though the empirical literature regarding the financialization of commodities had promoted policy debates the theoretical literature on the subject matter remains scarce. Basak & Pavlova (2016) conclude that the effects of financialization are only on storable commodity prices. In the presence of institutions, the prices of storable commodities and their inventories are higher than in the benchmark economy and the effects are more pronounced for commodities that are part of an index (Basak and Pavlova, 2016). Short positions are possible but are costlier than long positions. The volumes in a costly market are hence lower as in a market that is costly as the asymmetry between the costs of going long and short restricts the ability of some investors to trade pessimistically on new information. However such behaviour has limited evidence of inducing volatility. Boyd *et al.* (2016) find consistent evidence, documenting herding behaviour by speculators across 32 futures markets was limited in scope and serves to stabilize markets— speculators herd by buying (selling) into falling (rising) markets (Boyd *et al.,* 2018).

Literature Review

The agricultural futures market has progressed from obscurity to a recognized and familiar asset class in this millennium. Research in the last two decades has pronounced that equity-like returns are generated from long-only commodity futures investments. The income returns and prices are equally difficult to forecast. Agriculture futures indices are viewed as an alternative investment now by blue ribbon companies.

The index methodology incorporates the mechanics of rolling over of one contract to the next and weights of different contracts. The exchanges can limit legal frictions and promote trade layout the structure of the indices constituting price index (for producing price returns), total return index (excess return plus collateral return) along with excess return index (roll return or price return plus roll yield) (Erb and Harvey, 2016; Kumar Mahalik *et al*., 2014).

Rolling from one contract to the next bears no cash flow implications for the trader, however, from the sense of accounting, it is recognized for roll returns and price. Index trading days are classified into roll days and non-roll days. On roll days, the

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excess returns are equal to the index price return plus an adjustment from rolling of one futures contract to the next takes place. Roll yield return is negative when two contracts are in contango, zero when the term structure between the two contracts is unchanged and positive when two contracts are in backwardation.

On decomposing commodity index returns into their constituents, two schools of thought are present. The point of inflection between them is acceptance or disapproval of the theory of normal backwardation by J.M. Keynes. Decomposition of commodity futures excess return into price and roll returns provides important insights into the features and performance of commodity indices. Arnott *et al.* (2014)[1] state that Keynes theory may suggest positive roll yields on backwardation based on the experience of the previous century but that is an exception and cannot be taken to be a rule. Shemilt and Unsal (2004)[2] expressed that supply and demand for risk capital along with Keynes theory on roll yields may have been the drivers of GSCI having high returns like equity. Investors face differences of opinion on the same lines related to efficiency and rationality of markets.

Scope of Research & Research Objectives

The impact of speculation on futures prices due to index investment needs to be answered conclusively from a theoretical or empirical perspective. At present, there is no empirical evidence on the impact of trading volumes on volatility. The question of destabilization can be assessed by analyzing trading volumes and price levels as they have an informational role and hence exercise important signaling functions (Bredin *et al.*, 2018). In the case of speculation, some studies observe that unlike in the financial markets (Hau, 2006), financial speculation has decreased volatility in agricultural markets (Stoll and Whaley, 2012) (Hau, 2006; Stoll and Whaley, 2012). The role of financialization needs to be looked at from them being exchange partners who provide a hedge against price risks. They provide liquidity to the markets, facilitating economic risk diversification by providing risk adverse agricultural producers a hedging mechanism.

From the view of economic theory, agricultural commodity futures contracts do not belong to the sort of market that would be susceptible to asset pricing bubble formation. In particular futures contracts are instruments with a finite horizon without virtually any constraints on short sales, hold theoretical assumptions true and eliminates the potential of asset bubble formation. Additionally, deviations from fundamental values are less likely to occur as they are poached away (Patel *et al.*, 1991). The efficiency of price discovery in commodity markets due to the presence of futures markets reduces the incidence of experimental evidence that is related to bubble formation. However, the introduction of commodity index funds is targeted as drivers of creating global liquidity imbalances.

The bubble formation argument proposes that the influx of liquidity has led to speculative trading that has increased volatility, leading to a global food security crisis. However, there is a greater need of understanding the factors that lead to speculation and volatility. Barlevy (2007) explains that large price swings can occur naturally as a response to the change in demand and supply. Large-scale entry of noise traders with faulty beliefs about the future income streams happen due to violation of theoretical model assumptions. The bubble correction in general takes place when noise traders are driven out of the market by rational investors in the long run. The ambiguity of what classifies as a shift of demand and supply and what as bubble formation remains to be detangle.

Research Methodology

The objective of the inquiry is to evaluate previous literature on agricultural futures markets. Commodity price series depict time-series features highlighting sound statistical analysis such as (a) time-varying volatility (b) stochastic trends (c) high volatility

[1] Arnott, Robert, Denis Chaves, Jodie Gunzberg, Jason Hsu, and Peter Tsui (2014), "Getting Smarter about Commodities," *Journal of Indexes* (November/December), pp. 52-60.

[2] Shemilt, H., and S. Unsal (2004), "The Case for Commodities as an Asset Class," Goldman Sachs (http://faculty.fuqua.duke.edu/~charvey/Teaching/BA453_2006/GSCI_Strategic_ June_2004.ppt)

(d) co-movement in commodity price series (Myers, 1994[3]).

The common idea behind the tests is to understand hedging effectiveness. A reduction in hedging effectiveness has a significant impact on trading volume (Pennings and Garcia, 2004). The sample may not be homogeneous due to various restrictions in terms of suspension and increased margins for some agricultural commodities in an attempt to stabilize the price.

Service design is referred to as the futures contract specifications. Hedging effectiveness is related to service design that forms the core of futures exchange. Service delivery is the mechanism through which a customer is provided a service and it results from an interaction between futures exchange, its participants and factors such as the accessibility to brokers, clearing system and information provided by the trading system. In this regard, the agricultural futures markets remain to be context-specific (Wang *et al.*, 2011).

Financial traders trade for speculation reasons. On the basis of the prevailing information scenario, financial traders can either give or demand liquidity from the futures market (Acharya *et al.*, 2013). Financialization pressures have decreased risk premiums since the later part of the 2000s. Returns from the index would be modeled in an MGARCH framework with time-varying variance would measure volatility. In practice, weekly data of the index prices are taken, however as index trading of agricultural commodity futures is relatively new in India, daily prices would be considered.

$$r_t = (p_t - pt_{t-1}) \times 100$$

where r_t are returns and p_t is the natural logarithm of daily futures index price at time t.

The *first* step consists of preliminary analysis with squared returns being tested for serial dependence. Heteroscedasticity and auto-correlation consistent (HAC) estimators would be employed to conduct descriptive statistics, conditional on serial correlation and normality tests. Engle (1982) LM test is applied for testing ARCH effects (Engle, 1982).

The *second* step involves the adoption of bivariate models that have conditional mean for each MGARCH model specified. Each equation would be modeled as vector auto-regression (VAR) to remove joint auto-correlation. In order to allow possible structural breaks in the long-run, trace test of Johansen (1988). The following equation corrects joint auto-correlation

$$r_t = u_0 \sum_{t=1}^{\rho} \Gamma_l r_{t-1} + \in_t$$

where r_t is a 2×1 vector of returns

u_0 the 2×1 vector of deterministic components

Γ is the 2×2 matrices of coefficients capturing short-run dynamics and return spillovers and

$\in_t$ is 2×1 vector of errors. When the underlying prices are cointegrated, VECM is more suitable. The mean model then is

$$r_t = u_0 + \propto ECT_{t-1} + \sum_{t=1}^{\rho} \Gamma_l r_{t-l} + \in_t$$

Third, a bivariate BEKK specification for the conditional covariance is adopted as it allows shocks in the variance of one commodity to have spillover effects on another. Conditional covariances are

$$H_t = CC' + A' \in_{t-1} \in'_{t-1} A + B' H_{t-1} B$$

Representing Ht – 2×2 time-varying covariance matrix of VAR or VECM errors $\in_t$

C – Lower triangular matric

A&B – 2×2 matrices representing influence of past shocks or innovations and past volatilities or persistence on current volatility respectively.

On the introduction of (index trading) and E as lower triangular matrix, the mean model is

$$H_t = [C + EX_t][C+EX_t]' + A + A' \in_{t-1} \in'_{t-1} A + B' H_{t-1} B$$

The absence of Granger-causality from past index trading is expected in efficient markets. However, semi-strong informational efficiency, where publicly available information is instantaneously incorporated into prices, is more likely to occur in the long-run, while in the short-run, as in the span of data usually employed in empirical applications, it is usual to find inefficiencies (Garcia and Leuthold, 2004). Relative to Granger causality, the shortcoming of this approach is that direct causality may not necessarily occur as both index trading and returns might not consider important variables such as market fundamentals. Additional

[3] Myers, R. (1994), Time-series Econometrics and Commodity Price Analysis: A Review, *Review of Marketing and Agricultural Economics*, 62 (2), pp. 167-182.

controls will be introduced to include macroeconomic influences in the model.

The semi-strong informational efficiency, where publicly available information is instantaneously incorporated into prices, is more likely to occur in the long-run, while in the short-run, as in the span of data usually employed in empirical applications, it is usual to find inefficiencies on the other is accounted for. Although a dynamic conditional correlation (DCC) specification can deal with more series and is more parsimonious, BEKK is commonly favoured (Caporin and McAleer, 2011). To investigate if financialization pressures have lead risk premiums downward, daily index futures data from NCDEX AGRIDEX and spot prices will be considered.

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