Keywords
Commodity speculation, Price volatility, Position limits, Financial regulation, Hedging.

Overview
Over the period from 2002 to 2008, average commodity prices rose consecutively, year on year with the hike most pronounced over 2005 to 2008. Concurrently, trading activity in the commodity futures market increased fivefold, leading many to attribute the price hike and volatility over the period to excessive speculation by the financial sector. The growing concern intensifies as the increased activity is mostly non-commercial, of non-hedging nature. From a policy viewpoint, determining the root cause of the commodity price trend is the first step towards stabilizing prices. The urgency heightens as steep prices hinder global recovery following the 2008 Global Financial Crisis. The policy direction would largely be influenced by the root cause; the suggested trading limits proposed by Commodity Futures Trading Commission (CFTC) could stabilize prices should speculative activity be found to be destabilizing. Otherwise, unnecessary controls in the futures market could distort market operations, leading to more damages than gains as voiced by many industry players. This paper attempts to identify the role of financial speculation in commodity price movements, while exploring other possible influences such as the role of spare capacity and the role of rapidly developing countries, through intensive commodity import surges. To better represent commodities of different nature (energy and agricultural), this paper employs three types of commodities, namely crude oil, wheat and sugar.

Methods
This paper models commodity prices based on Fattouh's analysis on the duality nature of commodities (Fattouh, 2006). The physical nature is modelled using the partial equilibrium model proposed in Ai, Chang and Song (2006) while the capital asset nature is modelled using variable identified in Pyndick and Rottemberg (1990) as well as Chatrath, Christie-David, Lugli and Santoso (2009). The simple relationship proposed is $P_c = f(D_t, K_t) + u_t$ where D is the physical demand, K is the capital asset demand and u represents the error term.

The physical nature of commodity is influenced by market level factors. In equilibrium, the total demand for commodities will equate to total supply, which is determined by the summation of production (S), net import (X-M) and inventory from previous periods (I_{t-1}). Total demand comprises of consumption demand and desired inventory build-up in current period. We arrive at the relationship, $D_t = f(S_t, I_t, X_t\text{-}M_t)$.

The capital asset nature is influenced by macroeconomic factors. This paper employs variables such as US 3-month treasury bill rates, broad dollar index (FXR) and world reserves level and these variable are frequently used in the literature (Pyndick and Rottemberg, 1990; Chatrath, Christie-David, Lugli and Santoso, 2009). In attempt to examine the role of demand surge by rapidly developing countries, namely China and India, import data from the two countries are included in the model, under macroeconomic factors. We arrive at the relationship, $K_t = f$ (import_china, import_india, 3Tbill, FXR, world_reserve).

Apart from fundamental factors, speculative factors are built into the model to investigate its role in commodity price determination. This paper employs Commitment of Traders (COT) data by CFTC on reported speculative activity, classified into two broad categories: Large Hedgers (Commercial) and Large speculators (Non-Commercial). Each category is further expanded into four measures: Net positions, total volume, speculative index and open interest. Incorporating speculative components, the relationship becomes, $P_c = f(D_t, K_t, S_t) + u_t$.
The time series variables are first tested for stationarity. Subsequently, tests for cointegration between prices and determinant variables are conducted using Johansen's cointegration test. Vector Error Correction Method (VECM) are applied on cointegrated series to test for long run relationships, while Vector AutoRegressive (VAR) model is used for non-cointegrated series.

Check proposal type: Typical Concurrent Paper_x_ Extended Presentation Paper___

COMMODITY SPECULATION AND PRICE VOLATILITY

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Results Crude Oil: There is a long run relationship between prices and four variables, namely US net import levels, China net import levels, non-commercial total futures volume and open interest. Changes in US net oil imports appear to correct approximately 3.1% of the price deviation in the long run every month. Similarly, China net oil imports appear to correct approximately 5.7% of the price deviation in the long run every month. This is even more significant than US net oil imports, and is likely to be more influential as China energy consumption is set to grow rapidly. Interestingly, non-commercial total futures volume, a measure of speculative activity, show that changes in this speculative measure correct approximately 5.0% of the price deviation in the long run every month. Changes in open interest, a measure of futures market activity, appear to correct approximately 2.5% of the price deviation in the long run every month. These suggest that speculative activity has some impact on commodity price mocements.
A short run relationship between commercial speculative index and prices is also identifed. The negative coefficient suggests a moderating effect of hedging activity on price movements, agreeing with literatures that financial activity of the hedging nature improves risk spreading and dampens price volatility. This finding confirms that financial activity of the hedging nature stabilizes prices instead of causing volatility (Irwin and Sanders, 2009).

Wheat: There is a long run relationship between prices and two variables, namely production and commercial total futures volume. Changes in production appear to correct approximately 2.25% of the price deviation in the long run every month. Similarly, changes in commercial total futures volume appear to correct approximately 12.6% of the price deviation in the long run every month. The sign of the coefficient suggests a long run stabilization effect of hedging activity on prices.

Sugar: Both speculative and fundamental factors do not show long run nor short run relationships. This could possibly be due to the nexus between the agricultural and energy (ethanol production) uses of sugar, causing sugar prices to move after energy commodity prices, away from fundamental factors such as production.

Conclusions

This paper takes an intermediate stand that both fundamentals and speculation jointly determine crude oil prices. Speculative activity does play a supporting role in price determination but it is not the only driver. Fundamentals such as net imports, the result of consumption and production dynamics, are important in price determination. It is not surprising that US net imports appear to be an important driver as it is the world largest per capita energy consumer. However, a key finding is that the role of China in price determination is found to be larger. This has important policy implications. First, China's energy intensity is expected to heighten following its rapid development. Second, other rapidly developing countries may add on to price movement. Attempts at investigating the role of spare capacity, however, found that capacity bottle neck is not an important cause of recent price movements.

A production level is still primarily the most important driver on prices of wheat and is heavily reliant on weather. Speculation does not have a significant effect of prices, but position limits may disrupt hedging activity that helps stabilize wheat prices. Even though speculation have some influence on crude oil prices, setting an across the board position limit may harm the price stability in wheat markets. Market wide position limits should consider the impacts on the futures market as a whole rather than piecemeal.

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