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The role of speculation in international futures markets on commodity prices



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ABSTRACT

The role of futures contracts on spot prices has been one of the key focus areas of research since the recent surge in commodity prices and increase in the volatility of commodity returns. However, no consensus arises from this literature, and hence it is difficult to link the use of futures contracts in agricultural commodities by non-hedgers and the growing food insecurity within developing countries. The purpose of this paper is to highlight causal relationships from futures contracts to spot prices of underlying assets, namely agricultural commodities. As research that focus on exchange-traded funds do not provide any clear conclusions, we focus on the imbalance between short- and long-open positions, this imbalance being caused by the exchange traded funds' participation in futures markets. In this paper, we estimate relationships between financial variables including indicators for speculation in futures markets and the returns of cocoa, corn, soybean, wheat, coffee, rice, and sugar on a weekly basis from 1998 to 2013. Significant results lead to Granger-causality tests that in turn validate the hypothesis of a positive impact of speculation in futures markets to returns on the underlying commodities.

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1. Introduction

Commodity prices have continuously increased since 2000 with unprecedented peaks between 2006 and 2008. We also observe an increase in the volatility of these prices for many agricultural commodities. These trends are particularly detrimental to developing countries as both final consumption and imported inputs are more costly. Moreover, the unpredictability of income for producers tends to lower investment and consequently, growth (Loayza et al., 2007).

Fundamental factors such as inventory, climatic conditions, supply and demand can largely explain these trends. While the supply slowly increases, the demand for agricultural commodities rises together with the growth of emerging countries and with the growing demand for biofuels. Therefore, the short-run elasticity of supply and demand is low and the adjustment is initially done through prices and not through quantities.

Besides such fundamental factors, trading by investors who are not vulnerable to price fluctuations of physical markets (i.e., speculation) may also impact agricultural commodity prices. Theoretically, investor participation enhances markets liquidity as they are counterparties of hedging strategies and improves futures prices as predictors of future spot prices. However, expectations may disconnect from fundamentals and so foster speculative bubbles. For example, we can put forward this rationale based on expectations to explain the rise in real estate prices in 2005 and 2006. Applied to commodity

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markets, this rationale highlights the role of long positions in futures markets as these purchase commitments are successful strategies only when the spot price of the underlying asset increases until the expiration of the derivative contract through the cash settlement procedure.

In this context, many studies, without any consensus, aim at refining the links between speculation and price or volatility of agricultural commodities (Balcombe, 2010; Engle and Rangel, 2008; Gilbert, 2010a). As trade on over-the-counter markets is not monitored, i.e., by the Commodity Future Trading Commission (CFTC), a possible impact on the price of the underlying asset would be difficult – if not impossible – to identify. Moreover, focusing on index funds does not allow us to take the whole speculation in futures markets into account. Our starting point is that, in both over-the-counter and organized markets, the relative share of non-commercial investors has increased together with the share of long positions in futures markets. In this paper, we measure the speculation through a volume effect which is the sum of positions taken in the correspondent futures markets, jointly with a qualitative effect which is the share of long positions in total open positions (Aulerich et al., 2013). Therefore, this paper aims at contributing to the debate related to the link between speculation on derivative commodity markets and returns of underlying assets namely agricultural commodities. More specifically, using the two-stage least squares method (2SLQ), we estimate whether the yield of seven agricultural commodities including cocoa, coffee, corn, rice, soybean, sugar, and wheat may be explained by speculative transactions in futures markets. To that end, we focus on a long period as we test the weekly impact of speculation over 1998–2013 (which includes major financial crises), only for agricultural prices.

We highlight a robust positive relationship between commodity prices and the share of long positions in futures markets. Except for sugar and rice, a positive link also appears between commodity prices and the sum of open positions in futures markets. In other words, our results support the hypothesis that states that non-commercial players in futures markets tend to raise the prices of agricultural commodities in physical markets. Such a finding is confirmed for several commodities through Granger-causality tests. Second, we also test the impact of volatility of returns, together with other variables as oil price, VIX index, and bond yields. We use an Exponential GARCH (EGARCH) model to compute the volatility of returns. The result shows that the volatility of returns and bond yields are not significant contrary to what we find for oil prices. We also find that agricultural returns are negatively linked to the VIX index which confirms the possibility for investors to alternate between commodity and equity markets.

The paper is organized as follows. First, we draw a literature review in Section 2. Then, we present the estimation methodology and data in Section 3. First results are presented in Section 4 and then completed by causality tests in Section 5. Section 6 summarizes these findings, indicating that the regulation of transactions in futures markets may prevent the surges in commodity prices and their adverse effects.

2. State of the art

The changes in agricultural commodity prices are partly due to dynamic imbalances between demand and supply. However, the determinants which can explain this imbalance are different according to the authors, hence the absence of consensus on the role of each factor (Wright, 2009). In fact, these determinants may be structural or cyclical; they may be related to markets or specific to products, and may be linked to fundamental factors but also financial factors, in conjunction with the financialization of commodity markets and with the joint dynamics of spot and futures prices (Gaul and Theissen, 2014). To explain the recent surge in food and agricultural commodities, particular attention is drawn to the rapid growth of emerging countries, to low inventory size and to the growing production of biofuels (Abbott et al., 2008; Gilbert and Morgan, 2010). Scott et al. (2009) show that the production of biofuels at a global level has a significant impact on the prices of corn, sugar, barley and soybean, as the result of the conversion of food crops to agro-fuels.

According to Balcombe (2010), the changes in the returns of agricultural commodities (and inventory levels), in turn, increase prices' volatility in global markets. We also note that the volatility transmission between various commodity markets has increased, especially from oil markets (Demirer et al., 2015). However except for rice and wheat, and for the period from 2007 to 2009, it should be noted that the volatility of agricultural commodity prices has not risen relative to the decades 1970–1980 (Huchet-Bourdon, 2011).

The U.S. monetary policy appears as another determinant of prices in commodity markets. Hayo et al. (2012) measure the volatility of prices by ARCH and GARCH models and show that both the expected changes in the target rate and the Fed communication tend to reduce volatility (excluding financial crisis periods), while unexpected events and non-standard measures of monetary policy have a destabilizing effect. In a VAR model, in addition to long positions in futures markets or oil stocks, Anzuini et al. (2013) focus on both the impact of the money supply and the federal funds rate on the evolution of prices. They find that expansionary monetary policy shocks (sometimes to face the financial crisis) tend to increase (weakly but significantly) the price index of commodities. Gilbert (2010a) estimates the effect on agricultural commodities of the world growth, the monetary expansion and the exchange rate movements since 1971. Each variable impacts world agricultural prices, even though exchange rate effects are very weak. In addition, the author finds that the impact of oil prices on agricultural prices is more or less strong over time. The impact of fundamental factors on oil prices in turn changes over time as well (Schalck and Chenavaz, 2015).

The difficulty of linking macroeconomic and financial factors has fostered the development of Spline-GARCH models. Engle and Rangel (2008) specify the high-frequency volatility of daily returns as a low-frequency component and then regress it on macroeconomic variables. The results from daily and monthly data show that the low-frequency component of

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