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Commodity returns co-movements: Fundamentals or “style” effect?



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ABSTRACT

This paper investigates dynamic correlations both across commodities and between commodities and traditional assets, such as equities and government bonds, using the Regime Switching Dynamic Correlation (RSDC) model. There are three major findings. First, results from correlations both across commodities and between them and equities and bonds are in line with the “style” effect theoretical findings. Before the recent financial crisis, while correlations across In-index commodities started to increase from mid-2005, correlations between them and equities and bonds remained at low level. Second, all correlations increased markedly with a regime change which coincides exactly with the demise of the Lehman Brothers on September 15, 2008. We therefore suggest that the low correlation between In-index commodities and equities and bonds detected before the financial crisis should not be interpreted as a weak integration between commodity and financial markets. Integration was actually high, as revealed by the financial crisis, but was masked by the “style” effect. Finally, the new and original finding here is the temporary nature detected of the financial crisis effect on correlations which reverted to their pre-crisis level from April 2013. This highlights the impact of the financial-based factors on commodity price movements.

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1. Introduction

The most attractive aspect of commodity investments is that they offer diversification benefits, both by hedging against inflation and by improving the risk-adjusted performance of a mixed-asset portfolio.

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This is made possible by the low, or even negative, correlations between this alternative class of assets and traditional assets, such as equities or bonds (Büyüksahin and Robe, 2014; Büyüksahin et al., 2010; Chong and Miffre, 2010; Daskalaki and Skiadopoulos, 2011; Gorton and Rouwenhorst, 2006). As equities performed poorly for two years following the 2000 burst of the Internet bubble, these alternative assets were therefore increasingly included in the strategic portfolio allocation process by institutional investors, particularly pension funds. The inflow of commodity index investors¹ and increasing trading in and out of commodity futures in order to replicate commodity indices initiated the commodity financialization process.

A new feature to emerge from the recent financial crisis was that the synchronized sharp decline in equity and commodity prices in 2008 indicated increasing correlations between the two markets. This dramatic increase in commodity–equity correlations was preceded by a major debate centered on whether commodity prices were being driven by financial influences (Masters and White, 2008). One standard way to measure the integration level, both between conventional financial and commodity assets and between seemingly unrelated commodities themselves, is through conditional correlations between those assets. The aim of this paper is twofold. First, we analyze correlations both across commodity futures returns and between them and traditional assets. Second, we measure the impact of the 2007–2008 financial crisis, assessing whether the crisis caused a temporary or a permanent shift in the correlation trend and thereby providing insights into commodity price movements during recent years.

A significant body of research has documented the weak correlation between traditional assets and commodities before the financial crisis (Büyüksahin and Robe, 2014; Büyüksahin et al., 2010; Chong and Miffre, 2010; Erb and Harvey, 2006; Jensen et al., 2000; Tang and Xiong, 2012) and the rapidly rising correlation since then (Büyüksahin and Robe, 2014; Büyüksahin et al., 2010; Silvennoinen and Thorp, 2013; Tang and Xiong, 2012). Conversely, Choi and Hammoudeh (2010) and Silvennoinen and Thorp (2013) show that equity–commodity correlations started to rise gradually as early as 2003 indicating the onset of the integration between the two different markets. As for correlation between commodities, Tang and Xiong (2010, 2012) stressed the importance of financialization in increasing correlations among commodities; the financial crisis simply further magnified this effect. However, most research is done using a linear dynamic conditional correlation (DCC) GARCH approach. In order to take into account correlation regime shifts, either split sample estimation (Büyüksahin and Robe, 2014; Büyüksahin et al., 2010) or rolling regressions (Tang and Xiong, 2010, 2012) are employed. These estimation techniques do not provide precise timing of parameter shifts; this is treated exogenously within the former method and largely depends on the size of windows within the latter. A rare exception in recent literature, Silvennoinen and Thorp (2013) treat endogenously the time-varying nature of correlation using a bivariate conditional volatility and correlation dynamics model (DSTCC–GARCH), developed by Silvennoinen and Teräsvirta (2009a). The problem with such an approach is that the regime switch crucially depends on the transition variable selected.

Our paper contributes to this rich debate by extending previous studies in two principal respects. First, from a methodological perspective, a novel and distinctive feature of the paper is that it adopts the Regime Switching for Dynamic Correlations (RSDC) model of Pelletier (2006), estimated using the EM (Expectation–Maximization) algorithm. The notable advantage of estimating the RSDC model lies in allowing for time variation in correlation matrices which evolve according to a regime switching process. This model enables us to detect correlation regime change endogenously. Moreover, unlike autoregressive formulations, which deliver information that is not easily interpretable from an economic point of view, the RSDC model offers a clear-cut economic explanation, given that each regime is linked to a constant correlation matrix which can be cross-referenced, for instance to bull or bear market periods. This enables us to shed light on more general commodity market behavior during recent years, while making allowance for the regime changes detected by the model. Second, we exploit a more extensive data set, covering the period of the 2007–2008 financial crisis. While most papers

¹ The CFTC staff report (2008) estimates that the total amount invested in commodity indices by non-commercial participants increased from \$15 billion in 2003 to \$200 billion in 2008.

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