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Informational efficiency and spurious spillover effects between spot and derivatives markets☆

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ABSTRACT

Derivatives markets produce the means for price discovery as leading indicators in the transmission of new information. Examining volatility spillovers between spot and derivatives markets without accounting for possible disequilibria in the long term relationship could potentially result in spurious spillover effects. Our paper aims to contribute in this literature by controlling for possible disturbances in the long-run equilibrium relationship between the two markets. By application of a regime shift approach we provide evidence of a time varying spillover effect from derivatives to spot markets. However, this effect is inconclusive in the absence of a significant (1 −1) cointegration relationship.

1. Introduction

During the past decades the derivatives markets have contributed substantially to the effectiveness of financial markets. Miller (1997), Merton (1998) argued that, initially, the establishment of derivatives markets contributed to risk management through the hedging processes and enhanced the informational value of financial derivatives products, increasing, thus, the investment opportunity set in financial markets.

Research on the relationship between spot and derivatives markets is voluminous. As a rule, researchers focus either on the long or the short run relationship between derivatives and spot prices and yields, respectively. The long run relationship between spot and derivatives products is based on the hypothesis that derivatives contracts prices incorporate investor expectations of future spot yields, given all available information up to the date the contract is purchased. On the other hand, the transmission process of information governs

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the short run structure of the abovementioned relationship, since the lead–lag and the spillover effects imply an efficient functioning of derivatives markets. Nevertheless, previous papers investigate separately the unbiasedness hypothesis[a] (UH) and the lead–lag effects between these markets, deriving spurious spillover effects, which depend on the sample examined and the econometric methodology applied.

According to the normal backwardation theory the expected future spot prices are greater than derivatives prices and consequently greater than spot prices. The positive deviation between derivatives and spot prices represents the insurance premium that speculators require from hedgers in order to undertake the risk that arises from future spot price fluctuations.

The informational value of derivatives markets contributes to the efficiency and completeness of financial markets, mainly because derivatives yields represent unbiased predictors and/or expectations of future spot yields. The long run equilibrium relationship between spot and derivatives markets is very often disturbed by short run deviations, caused either by trading imbalances in the way demand and supply forces interact or by the different regulation framework of these markets. Hence, hedgers and speculators are active units in the derivatives markets and jointly contribute to the formation of fundamental values. The flow of information between these markets is jointly investigated with possible spillover effects that represent the mechanism according to which economic units react in the accumulation of new information, formulate efficient risk-return regimes and contribute to effective risk allocation.

The objective of this paper is to investigate the spillover effects between spot and derivatives financial products in a framework that takes into account the time properties of their long run equilibrium relationship. More specifically this paper fills the gap in the literature by examining the spillover and the lead–lag effects between spot and derivatives markets within a regime shift approach that considers separately the subperiods for which there exist structural breaks on the cointegration relationship of spot and derivatives prices.

The rest of the paper is organized as follows. Section 2 provides a brief discussion of the literature, while Section 3 describes the data and the applied econometric methodology. Section 4 presents the empirical findings and finally, Section 5 concludes the paper.

2. Literature review

Grossman (1977) argued that financial information is traded in derivatives markets and as a result, derivatives yields should include the cost of the accumulated new information. However, he points out that in developed and efficient markets the transmission of information is publicly available and hence, is uniformly distributed to investors, eliminating any arbitrage opportunities. In the absence of noise, the information is costless and is transmitted from the informed to non-informed units.

Many analysts have investigated the long run equilibrium relationship between spot and derivatives yields and by considering the informational efficiency of financial products they have found that very often derivatives markets contribute substantially to the price discovery process. Fama and French (1987) investigated the relationship between spot and derivatives using data from 21 commodities. Based on both the theory of storage and the derivatives risk premium (decomposition of futures prices into an expected risk premium and a forecast of a future spot prices), their empirical results are in favour of the theory of the storage cost, according to which the contemporaneous spot and futures prices are expressed in terms of interest foregone in storing commodities, warehousing costs and a convenience yield on inventory.

Brenner and Kronner (1995) utilized the arbitrage free cost of carry asset pricing model in order to investigate the relationship of spot and derivatives markets. Using data from exchange rates as well as from commodities they applied a cointegration framework and concluded that the UH is valid in most cases. Norrbin and Reffett (1996) examined the UH using forward rates. They relied on a cointegration framework and found significant $(1 -1)$ cointegrating vectors. Furthermore, by application of the VECM model they concluded that the forward rates adjust completely in possible short-run deviations of the common trend in contrast to spot rates.

Abhyankar (1998) used spot and futures prices from two main financial indices, the S&P500 and the FTSE100, and investigated the lead–lag and causality relationship between the two markets. Based on a nonlinear causality model he concluded that there exist significant bi-directional nonlinear causal relationships

[a] The unbiasedness hypothesis states that the derivatives yields are efficient and unbiased predictors of future spot yields given all the available information.