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# Transaction costs, arbitrage, and volatility spillover: a note

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## Abstract

In this paper, we analyze the effect of the reduction of transaction costs on the correlation between the spot index and the index futures returns and on the linkage in the second moments of both markets. Using a bivariate Glosten–Jagannathan–Runkle (GJR) process, that takes into account cross-market interactions, we find that the reduction of the width of the nonarbitrage band leads to a significant increase in the contemporaneous correlation and to a significant increase in the volatility spillovers between the two markets.

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## 1. Introduction

There is an extensive literature on the linkage between the spot index and the index futures markets (see, among others, Frino, Walter, & West, 2000; Gulen & Mayhew, 2000; Min & Najand, 1999; Tse, 1999). In this context, one of the most studied topics is the efficiency of the index futures market centred on the arbitrage-based cost-of-carry relationship between the two assets. In a perfectly efficient market, profitable arbitrage should not exist as prices adjust instantaneously and fully to new information.

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Violations of the cost-of-carry relationship may appear for a variety of reasons (Stoll & Whaley, 1990). The first reason is that the market for individual stocks is not perfectly continuous. The second one is related to time delays in the computation and reporting of the stock index value. The third refers to the lead–lag behavior of stock index and stock index futures that may reflect the greater speed with which investors' views are reflected in the futures markets. The latter reason is based on the effect of the transaction costs that induces noise in the relationship. Our paper is related to this last topic.

The role of the transaction costs in the pricing dynamics of the spot index and futures index and specifically in price discovery has been analyzed in several papers (see, among others, Fleming, Ostdiek, & Whaley, 1996; Gay & Jung, 1999; Kim, Szakmary, & Schwarz, 1999). Nevertheless, the purpose of this paper is somewhat different. We are interested in analyzing the effect of the reduction of the transaction costs on the contemporaneous correlation and on the volatility spillovers between the spot index and the future index markets from an empirical point of view.

As is well known, the existence of transaction costs implies that the price of futures could fluctuate within a band around their theoretical value without representing a potential profit opportunity. When the price of futures deviates from this band, arbitrageurs have incentives to trade in both the spot and the futures markets.<sup>1</sup> As a consequence, we expect that a modification of the width of the band may influence the correlation between these markets. Because both markets are linked in their second moments (see, Koutmos & Tucker, 1996), we also expect that this fact may influence the volatility spillover between them.

To answer these questions, a particular event in January 1997 in Spain is studied. The Spanish Equity Derivatives Exchange, MEFF RV, changed the contract size of the Ibex35 futures. The new contract, called “Ibex35 Plus,” was 10 times greater than the old “Ibex35,” but the general fees applicable to the trading of contracts were maintained for market makers.<sup>2</sup> We think that this provides a good opportunity to analyze the effects of the reduction of the transaction costs on the linkage between the stock index and the index futures markets. To do this, we use an error correction model with innovations following a bivariate GJosten–Jagannathan–Runkle (GJR) process that takes into account cross-market volatility interactions to describe the joint distribution of spot returns and index futures returns.

The remainder of the paper is organized as follows. Section 2 describes the theoretical framework and the hypotheses to test. Section 3 contains a description of the data used in the paper. Section 4 presents the empirical design and in Section 5 some considerations regarding the results are included. Finally, Section 6 contains the conclusions that can be drawn.

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<sup>1</sup> It is important to note that these conventional strategies are not necessarily risk-free and, in this sense, it is possible to maintain deviations from the band. This aspect and the influence of the transaction costs they involve can explain the fact that “mispricing” can be related with time to maturity and it can be path dependent, as MacKinlay and Ramaswamy (1988) have shown.

<sup>2</sup> The general fees for trading of contracts (settlement and clearing) were only multiplied by 9 for other investors [see Circulars no. 1/96 and 18/96 (MEFF RV)]. In 1996 these fees were equal to 0.5 index points. In January 1997 they were equal to 0.05 index points. Moreover, the brokerage rates (including these costs) were reduced from 2.5 to 1.5 index points. An index point was equal to 1000 Spanish pesetas and is now equal to 10 Euros.

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