

# The impact of futures trading on volatility of the underlying asset in the Turkish stock market

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## Abstract

This paper examines the impact of the introduction of stock index futures on the volatility of the Istanbul Stock Exchange (ISE), using asymmetric GARCH model, for the period July 2002–October 2007. The results from EGARCH model indicate that the introduction of futures trading reduced the conditional volatility of ISE-30 index. Results further indicate that there is a long-run relationship between spot and future prices. The results also suggest that the direction of both long- and short-run causality is from spot prices to future prices. These findings are consistent with those theories stating that futures markets enhance the efficiency of the corresponding spot markets.

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## 1. Introduction

Stock index futures have been considered as one of the most successful financial products.<sup>1</sup> Even though trading in futures market has two decades of history in the US and other developed markets, it is a relatively recent phenomenon in emerging markets. For instance, although the Turkish stock market is one of the fastest growing emerging markets it was not until 4 February 2005 that a futures contract based on the Istanbul Stock Price Index 30 (ISE-30) was introduced on the Turkish Stock Exchange.

After futures trading have been introduced in all main stock exchanges, the economic literature intensified the debate on the impact of derivative trading on spot price volatility. On the theoretical front, two different arguments exist. The first group of researchers supports the argument that futures trading increase the volatility of the underlying spot market.<sup>2</sup> They argue that futures markets attract uninformed traders because of their high degree of leverage and the activity of those traders increases spot market volatility. The second group of researchers presents arguments in favor of the idea that futures trading have a beneficial effect on the underlying cash market by decreasing its

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<sup>1</sup> According to the Bank For International Settlements (BIS) derivatives statistics, trading value of futures exchanges has exceeded USD 1.3 quadrillions and approximately 9 billions contracts have been traded only in the first nine months of 2006.

<sup>2</sup> See Refs. [11,9] and [32].

volatility.<sup>3</sup> They argue that futures trading increases market depth and enhances efficiency, therefore reduces spot market volatility. In addition, futures market can help to reduce the risk involved in the cash market by providing the hedging opportunities to the market participants. The uncertainty of the existent theoretical literature implies that the issue of how futures market affects the volatility of the underlying spot markets is mainly an empirical issue. At present, however, empirical literature has also presented mixed results.

Some researchers alleged that the market of derivatives increases the volatility of the spot market. For instance, Harris [19] observed an increase of volatility of the S&P500 index after the introduction of derivatives in 1983 in his cross-sectional analysis of covariance for the period 1975–1987. Pok and Poshakwale [28] studied the impact of the introduction of futures into the KLSE index of the Malaysian market. They found that the derivatives increased the volatility of the underlying market. Antoniou and Holmes [4] suggested, for the London Stock Exchange, an increased volatility following the introduction of the FTSE100 index futures contracts. Ryoo and Smith [30] investigated the impact on the spot market of trading in KOSPI 200 futures of the Korean market. Their empirical results showed that futures trading increased the speed at which information was impounded into spot market prices, reduced the persistence of information and increased spot market volatility.

Several empirical studies suggested that the market of derivatives decreases the volatility of the spot market. Antoniou et al. [3] studied the effects of futures trading on the spot market volatility of six stock markets (Germany, Japan, Spain, Switzerland, UK and US). They found that, for Germany and Switzerland, introduction of futures trading had had a significant negative effect on the volatility of the spot market. Bologna and Cavallo [7], in their studies on the MIB30 index in the Italian market, found that the introduction of stock index futures had led to diminish the stock market volatility. Pilar and Rafael [27] studied the introduction of derivatives in the Ibex35 index of the Spanish market. They found that the derivatives market had diminished the volatility of the underlying market. Baklaci and Tutek [5] examined the impact of futures market on spot volatility in the Turkish derivatives market, using data from 2004 to 2006. Their results indicate that even though it has been in operation for a short period of time, the futures market in Turkey has significant impact in reducing volatility in the spot market. Drimbetas et al. [13] studied the Greek stock market by analyzing the impact of introduction of the futures and options into the FTSE/ASE 20 index on the volatility of the underlying index. Their results suggested that the introduction of derivatives had induced a reduction of the conditional volatility of the FTSE/ASE 20 index.

In contrast to the previously mentioned studies, several researchers found that the market of derivatives does not influence the spot market. Freris [17] studied the effect of Hang Seng Index Futures on the behavior of the Hang Seng Index. They found that the introduction of stock index futures trading had no measurable effect on the volatility of the stock price index. Antoniou and Foster [2] examined the effects of introduction of futures contract on Brent Crude Oil on its spot market. They found no substantial change in volatility between the pre- and post-futures periods. Darrat and Rahman [12] studied the S&P500 index and found that the S&P500 futures volume did not affect spot market volatility. Kan [21], in his study on HIS index of the Hong Kong market, found similar results.

In this paper, we aim to provide evidence on the impact of the introduction of futures trading on spot market volatility in the Turkish stock market. The contribution of the paper is threefold: First, most of the previous research on the impact of the introduction of futures trading on the spot market volatility, which produced mixed results, has focused on mostly developed markets. Very little work has been done for emerging markets. Hence, the aim of this study is to contribute to the ongoing debate about the impact of derivatives trading on the underlying spot market volatility by providing new evidence from an emerging stock market, Turkey. Most previous studies on the Turkish stock market have focused solely on the Istanbul Stock Exchange (ISE) and only one study, Baklaci and Tutek [5], investigated the linkages of the ISE with the newly established derivatives exchange. Our study significantly differs from that of Baklaci and Tutek [5]. We use a longer period of time and an asymmetric GARCH model to model volatility.<sup>4</sup> In contrast to their study, we use a dummy variable, which measures the introduction of futures, in the variance equation to examine the impact of the introduction of futures market on the volatility.<sup>5</sup> We also examine

<sup>3</sup> See Refs. [29,8,23,31].

<sup>4</sup> The existence of this asymmetric effect implies that a symmetric specification on the conditional variance function as in a conventional GARCH model is theoretically inappropriate (see Ref. [15]).

<sup>5</sup> Baklaci and Tutek [5] divided their sample into two subsamples: The pre-futures period and post-futures. Each subsample includes around 243 observations. McClain et al. [25] suggest that 300 observations is a threshold value estimating a reliable GARCH model. Since the GARCH model in their paper is based on only 243 observations, one may argue that the volatility estimates are misleading.

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