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International Review of Financial Analysis
12 (2003) 311–328

IRFA
INTERNATIONAL REVIEW OF
Financial Analysis

Price limits in futures markets: effects on the price discovery process and volatility

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Abstract

Price limits are actively employed by many futures exchanges as a regulatory mechanism directed at reducing volatility and improving price discovery process. The aim of this paper is to investigate whether price limits achieve these goals without affecting market liquidity for a number of agricultural futures contracts. We employ models of changing volatility in order to show that price limits do not appear to significantly reduce market volatility. In addition, we find evidence confirming the hypothesis that price limits delay price discovery instead of facilitating it. Our results also suggest that the impact of price limits on volatility and price reversals, found in previous studies, are mainly due to the properties inherent to the futures returns, such as volatility clustering. Finally, although trading decreases significantly due to the price limits, traders do not seem to switch from the contracts affected by price limits to other maturities in order to minimize the impact of circuit breakers.

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JEL classification: G10; G14; G18

Keywords: Futures markets; Price limits; Circuit breakers; Volatility

1. Introduction

The problem of preventing excess market volatility and financial market crashes has long been a subject of discussion. While practically no regulatory measures had been taken until the 1987 crash on most of the world stock markets, the futures markets were subject to trading

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restrictions (the so-called circuit breakers), predominantly in the form of price limits, since the end of the 1960s.

The commonly cited objectives of circuit breakers include facilitating the price discovery process, reducing market volatility and transactional and implementation risks, and (for futures markets) use of price limits as a partial substitute for margin requirements. Although several studies address the problem of circuit breakers' effectiveness in achieving these goals, most of the empirical research on circuit breakers has been done for stock markets.¹ In addition to the different types of circuit breakers used by stock and futures exchanges (trading halts vs. price limits), these two markets differ in other aspects. In particular, there is simultaneous trading in futures of different maturities on the same underlying asset. However, the circuit breakers are triggered independently in different maturities, providing an opportunity for traders to use futures of a maturity that was not affected by the price limits. In addition, Brennan (1986) argues that due to the institutional structure of futures markets, in particular to the daily settlement mechanism, the circuit breakers in futures markets play a different role than in the stock market. Therefore, futures markets provide a more general setting for a study on circuit breakers than a stock market. A few studies conducted for futures markets resulted in mixed evidence. Studies of the price behavior near price limits by Arak and Cook (1997) and Berkman and Steenbeek (1998) do not confirm the hypothesis that price limits may become self-fulfilling, drawing the market price to the limit level. On the other hand, no agreement about the effects of price limits on the market price discovery process exists. While Ma, Rao, and Sears (1989a, 1989b) find that traders tend to overreact, and, thus, circuit breakers play a positive role by reducing both overreaction and volatility, Chen (1998) rejects this hypothesis.

The aim of this paper is to investigate the impact of price limits, implemented by a number of U.S. futures exchanges, on futures trading. Contrary to the stock market, the daily settlement rule makes the closing price an important factor for futures trading. Therefore, we attempt to separate the effects of the price limit hits that cause the markets to close at the limit and those that do not affect the closing price. The futures markets also provide a more general setting for our study than a stock market since there are several contracts on the same underlying commodity traded simultaneously. The price limits are set on these contracts independently of each other. In this paper we examine whether the traders avoid the price limits by switching their trades to a contract of different maturity, which is not affected by the price limits.

First, we investigate whether price limits prevent overreaction or whether they merely delay price discovery. The overreaction hypothesis, which is one of the main motivations for the price limits, suggests that traders systematically overreact to important news, so that prices have to revert in the short run in order to achieve an equilibrium. If overreaction exists in the futures markets, price limits can prevent excessive price movements, and, thus, ease the equilibrium price discovery. However, if the price limits are set in such a way that the

¹ See, for example, Huang, Fu, and Ke (2001), Kim and Rhee (1997), Kryzanowski and Nemiroff (1998), Lauterbach and Ben-Zion (1993), Lee and Chung (1996), Lee, Ready and Seguin (1994), Phylaktis, Kavussanos, and Manalis (1999), or Santoni and Liu (1993).

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