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The effectiveness of position limits: Evidence from the foreign exchange futures markets

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ABSTRACT

This study considers the effects of the relative size of hedger and speculator open interests and the potential impact of implementing position limits on the price discovery process in both JPY–USD and EUR–USD futures markets. Hedging trading exerts a negative impact, regardless of its size, on price discovery in futures markets. Hedgers are less likely to be information motivated, so their trading uniformly delays the price discovery process. However, there is a positive and nonlinear impact of speculators' trade size on price discovery, the contribution of which depends on the relative size of the speculative open interest. Contrary to conventional wisdom among regulators, speculative trading does not harm the market in terms of market efficiency; as long as the percentage of speculators' open interest is below an endogenously determined threshold (approximately 20% for EUR–USD and 16.3% for JPY–USD), speculative trading even improves futures market efficiency.

1. Introduction

During a 2009 hearing of the Commodity Futures Trading Commission (CFTC) regarding the use of position limits to control excessive speculation in the commodity futures markets, CFTC Chair Gary Gensler asserted, "No longer must we debate the issue of whether or not to set position limits... it's more a question of how than whether" (Acworth, 2009). He further explained that the CFTC was required by statute to apply position limits to prevent "undue burdens" caused by excessive speculation. This explanation reflects the strong beliefs among regulators that limiting speculative positions is beneficial, such that the Commodity Exchange Act even applies speculative position limits or position accountability for speculators in some futures markets. Yet little empirical evidence confirms whether efficient futures markets pricing actually improved with the imposition of speculative position limits, how the sizes of position limits should be set, and whether exemptions of position size should be granted to hedgers.

In particular, the effectiveness of derivative market position limits remains subject to debate. Kyle (1984) and Kumar and Seppi (1992) argue that position limits are important for controlling market manipulations. Position limits in futures markets have been applied widely in practice, in efforts to contain speculators' participation and stabilize futures prices. However, Gastineau (1992), Telser (1993), and Grossman (1993) posit that position limits are ineffective controls for market manipulation, and Gastineau and Jarrow (1991) argue that arbitrary position limits even reduce market liquidity and induce nonsynchronous pricing in related markets. According to Grossman (1993), with position limits, speculators shift to foreign or substitute markets. Dutt and Harris (2005) document controversies about the use of position limits. Furthermore, to the best of our knowledge, theoretical and empirical evidence regarding the effect of hedging trading on market efficiency is virtually nonexistent. Overall then, empirical evidence of the effectiveness of either hedging or speculative position limits remains scarce.

We therefore examine the impact of the position sizes of hedgers and speculators on the price discovery process and explore the potential impact of implementing position limits in the JPY–USD and EUR–USD futures markets. Increasing understanding of the impact of hedgers and speculators on price discovery is important for both academia and regulators, because relative trading positions have implications for the effectiveness of position limits, as well as for market quality. Most commodity futures and many financial futures markets have stipulated (likely arbitrary)

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speculative position limits, set by the CFTC or the exchanges themselves. In our sample, the currency futures are not subject to position limits.[1] Thus, we apply nonlinear regressions to find endogenous change points for the position sizes, which then serve as a guide to assist in the determination of position limits. We examine their hypothetical effectiveness, were such limits to be set. Accordingly, we summarize the position accountability and/or position limit requirements of the Chicago Mercantile Exchange (CME) currency futures contracts, as we show in the Appendix A.

Substantial literature has emerged to investigate lead–lag relationships and contributions to price discovery between the foreign exchange (FX) spot and futures markets.[2] Studying price discovery allows us to determine how markets incorporate new information about the underlying fundamental asset value. In this paper, we consider how positions of various types of traders affect the price discovery function of the futures market relative to the spot market. To capture the nonlinearity in the dynamic process of price discovery of futures/spot markets, we estimate a nonlinear, logistic smooth transition regression (LSTR) model to trace the dependence between information efficiency and the relative positions of hedgers and speculators in the FX futures market, using data of hedgers' and speculators' positions collected from the weekly commitment of traders (COT) report from the CFTC.[3]

The impact of trading activities on futures market efficiency may vary with the relative magnitude of hedgers' and speculators' trading. Gastineau and Jarrow (1991) note that when speculative trading is not dominant, it may contribute positively to market efficiency, because it can help impound private information into prices. In contrast, if speculators' transactions constitute a large proportion of total market activity, their trading may destabilize prices.[4] This situation implies a potential nonlinear effect of relative hedging versus speculative trading on the futures market's share in the discovery of efficient prices. Therefore, our study of nonlinear dynamics in price discovery and finding an endogenously determined threshold level of trading positions that affect the interaction between price discovery and trading position is valuable for regulators who must establish position limits and trading rules.

According to Keynes's (1930, 1983) normal backwardation theory, hedgers have net short positions in futures markets, so they can transfer their exposure risk in the spot market. Their hedging pressure tends to drive down futures prices relative to the expected value of the spot price, resulting in mispricing in futures markets. Several studies, including those by Houthakker (1957) and Cootner (1960), have reformulated original backwardation theory to allow hedgers' positions to be net long, such that futures prices may be higher than the expected future spot prices.[5] However, speculators who enter on the opposite side of the futures contracts bear risks and receive compensation in the form of a positive expected profit on their positions. The presence of speculators causes futures prices to be revised toward the expected value of spot prices. According to these arguments, hedgers' trading activity should lead to mispricing; speculators' activity should provide liquidity and pricing corrections. In turn, the speculators' (hedgers') trading activities seemingly have a more positive (negative) impact on market efficiency.

However, several studies indicate exactly opposite informational roles played by speculators and hedgers. Wang (2002a) finds that hedgers in currency futures are typically large commercial banks, multinational corporations, or commercial dealers with private information, because they have more customer order flows from spot and forwards markets. In addition, they may have their own seats in futures exchanges, so they can benefit from gathering information. Wang (2002a) argues that speculators and small traders in the currency futures markets are likely uninformed.[6] These uninformed traders may trade irrationally in response to noise and overreact to information. According to these arguments, speculators' (hedgers') trading activities provide a negative (positive) contribution to price discovery, in direct contrast with the theory of normal backwardation. The exact information roles that hedgers and speculators play thus remain empirical questions and may depend on their relative position sizes.

We use a two-stage procedure to examine the impact of the trading positions held by hedgers and speculators on price discovery in FX futures traded on the CME. To begin, we use the information share approach of Hasbrouck (1995) to evaluate the weekly contributions of JPY–USD and EUR–USD futures markets to the futures/spot price discovery process. With measures of information shares for the futures market, we can estimate the logistic smooth transition regression (LSTR) model to determine how the efficacy of price discovery depends on the trading positions held by hedgers and speculators in the JPY–USD and EUR–USD futures markets.

Our results indicate that the relative trading activities of hedgers (speculators) relate negatively (positively) to the price discovery function of the JPY–USD and EUR–USD futures markets, in support of the normal backwardation and hedging pressure hypotheses.[7] That is, the presence of more hedgers in the market induces prices to move away from the efficient price. Instead, speculators' trading improves the futures market's efficacy in responding to

[1] They are subject to position accountability though. The position accountability rule requires persons holding positions greater than a certain number of outstanding contracts to report the nature of their position, trading strategy, and hedging information to the exchange. Different currency futures are required at different position accountability sizes and/or position limits in the Chicago Mercantile Exchange.

[2] For the USD–DM rate, Martens and Kofman (1998) find that futures prices lead the spot on the Reuters FXFX by up to three minutes. Tse et al. (2006) show that the GLOBEX electronic futures market provides the greatest contribution to price discovery in the EUR–USD market and that the online retail trading spot market leads price discovery in the JPY–USD market. Rosenberg and Traub (2009) further find that EBS spot rates contribute more to price discovery than do futures rates in the CME. Finally, Cabrera et al. (2009) reveal the dominance of the EBS spot market in price discovery, compared with the GLOBEX and E-mini futures markets for EUR–USD and JPY–USD markets.

[3] Speculators, hedgers, and small traders correspond to noncommercials, commercials, and nonreportable traders in the COT reports, respectively. The CFTC annually classifies reportable positions as commercial or noncommercial. Traders that take commercial positions to hedge specific risks are commonly regarded as hedgers. Noncommercial traders that trade futures for reasons other than hedging are speculators. Traders with non-reportable positions are referred to as small traders. Substantial research (e.g., Wang, 2001, 2003b, 2004; Sanders et al., 2004; Röthig and Chiarella, 2007; Chatrath et al., 2010) uses CFTC trader position data to proxy for trading activities in futures markets.

[4] A speculator buys when he or she believes the current price is below some "normal" price and sells when the present price appears above the "normal" price. Kaldor (1939) suggests that such an analysis assumes speculative activity is only a small proportion of the total market activity, so though they can influence the extent of price fluctuations, these speculative transactions cannot change the direction of price movements. In contrast, if speculators' transactions are a large proportion of the market, it may be more profitable for speculators to concentrate on forecasting the psychology of other speculators, rather than analyzing underlying fundamental values. Such transactions destabilize prices. Wang (2002a) also finds that changes in speculative positions destabilize the six foreign exchange futures markets.

[5] This modified hypothesis is sometimes referred to as the hedging pressure hypothesis.

[6] Wang (2002a) also suggests that speculators and small traders can interpret information signals precisely from volume and price changes, which results in a wider dispersion of beliefs and therefore greater volatility. However, hedgers possess some private information. They usually buy and sell within a relatively small range of prices around an intrinsic value, such that they dampen volatility.

[7] We employ other approaches to measure information shares too, including the common factor weighted approach of Gonzalo and Granger (1995) and the modified information share approach of Lien and Shrestha (2009). The results are qualitatively similar. See Baillie et al. (2002), de Jong (2002), Harris et al. (2002a, 2002b), and Hasbrouck (2002) for comparisons of the information share and the common factor weighted approaches.