The delta- and vega-related information content of near-the-money option market trading activity ☆

Thomas Rourke

Duquesne University, 600 Forbes Avenue, Pittsburgh, PA 15282, USA

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ABSTRACT

This paper evaluates the information content of trading activity in near-the-money option markets. The results provide compelling evidence consistent with hypotheses of delta- and vega-informed trading activity in near-the-money option markets for firms with actively traded near-the-money options. However, considerably less evidence in support of the same hypotheses is found for firms with thinly traded near-the-money options. Hence, both the delta- and vega-related information content of near-the-money option trading activity appear to be positively related to overall near-the-money option trading activity. Lastly, near-the-money option trading activity is, in general, more vega-informative than delta-informative.

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1. Introduction

Black (1975) conjectures that investors with private information may prefer to trade options rather than the underlying stock because of the leverage inherent in options trading, as well as because opening a short position using options may be easier than short-selling the stock.[1] Motivated by these

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  [1] Battalio and Schultz (2006) provide empirical evidence confirming that investors can indeed easily create inexpensive synthetic short positions using option markets.

arguments, researchers examine whether option trading activity contains new delta-related information, that is, information related to the *sign* of stock price changes. There is, however, considerable disagreement on the matter; some authors report evidence of relationships between option trading and future stock returns (Easley, O'Hara, and Srinivas, 1998; Lee and Yi, 2001; Cao, Chen, and Griffin, 2005; Pan and Poteshman, 2006; Roll, Schwartz, and Subrahmanyam, 2010; Hao, Lee, and Piqueria, 2013) while others do not (Vijh, 1990; Chan, Chung, and Fong, 2002).[2] However, many studies on the delta-related information content of option trading fail to consider the effect that stock return volatility has on option prices, and therefore may have on option trading activity.[3] Indeed, Maraachlian and Rourke (in press) report that option trading activity contains both delta- and vega-motivated components, but do not evaluate the information content of said trading activity. Additionally, Ni, Pan, and Poteshman (2008) document that daily option trading volumes are informative about future realized stock return volatility.

In this paper, I evaluate the delta- and vega-related information content of near-the-money option trading activity using the empirical framework of Hasbrouck (1991). Specifically, intra-daily stock price quotes are used to compute returns from a pure delta-motivated trading strategy, while intra-daily near-the-money call and put price quotes are used to compute returns from a vega-motivated trading strategy (i.e., returns on option straddles). As such, a proxy for stock return volatility, which may contain estimation error, is not required to estimate the vega-related information content in near-the-money option trading activity. Finally, the permanent delta- and vega-related price impacts from near-the-money option trade innovations are forecasted and hypotheses on whether delta- and/or vega-informed traders are active in near-the-money option markets are tested. This analysis is performed for a sample of firms with considerable variation in both firm size and near-the-money option market trading activity between May 2012 and July 2012.

In addition to providing a more comprehensive analysis of the information content of trading activity in near-the-money option markets, a contribution of this paper is the estimation of the permanent price effects of said trading activity. To draw inferences on the information content of option trading activity, many studies focus on contemporaneous relationships between trading and returns across stock and option markets (Easley, O'Hara, and Srinivas, 1998; Chan, Chung, and Fong, 2002; Hao, Lee, and Piqueria, 2013). However, if contemporaneous relationships exist between trades and returns, they are likely to contain both permanent and transitory components. By examining the protracted effects of near-the-money option trading activity on returns in stock and option markets, the permanent delta- and vega-related components can each be isolated from any transitory effects to draw better inferences on the information content of near-the-money option trades. This is particularly important because, given that multiple distinct motivations for informed option trading may exist, the inference problem stock and option market makers face is likely to be more complex than when only a single motivation for informed trading exists.[4]

To illustrate the complexity of this problem, suppose one trader is privately informed that future stock returns will be positive, while another is privately informed that future stock return volatility will be high. In such a case, the delta-informed trader may buy the stock, buy calls, and/or sell puts; meanwhile, the vega-informed trader will buy both calls and puts. Consider the impact of call trades on security prices; the ultimate call price impact of an informed buy order in the call market will be

[2] Similarly, studies examining the delta-related information content of option prices find equally mixed results; some authors find evidence that option prices are delta-informative (Manaster and Rendleman, 1982; Chakravarty, Gulen, and Mayhew, 2004; Holowczak, Simaan, and Wu, 2006; Hayunga, Holowczak, Lung, Nishikawa, Tayunga, 2012; Rourke, 2013) although others do not (Stephan and Whaley, 1990; Chan, Chung, and Johnson, 1993; Broussard, Muravyev, and Pearson, 2013).

[3] Capelle-Blancard (2007) models trading in stock and option markets when both delta- and vega-related information asymmetries exist. In contrast to Black (1975), this model predicts that if vega-informed trading is a large portion of total option trading activity, delta-informed individuals will prefer trading the stock rather than options.

[4] Biais and Hillion (1994) consider delta-informed trading and hypothesize that market makers face a more difficult inference problem when both stock and options are traded relative to when only the stock is traded. Extending their logic suggests that a second potential source of information asymmetry may further exacerbate the inference problem. Casual comparison of the models of stock and option trading in Easley, O'Hara, and Srinivas (1998), where only delta-related information asymmetry exists, and Capelle-Blancard (2007), where both delta- and vega-related information asymmetries exist, supports this conjecture.