



Stock and option market divergence in the presence of noisy information

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ABSTRACT

We examine market behavior of the stock and option markets upon the arrival of noisy information in the form of CNBC's *Mad Money* recommendations. If stock and option markets are not equally efficient, they should respond differently to noisy information, with the less efficient market more susceptible to noise. We find that the stock market is less efficient than the option market. The abnormal difference between option-implied and actual stock returns is negative and significant upon exposure to noisy information. This difference may yield an economically significant monthly trading profit of up to 5%. We conclude that the stock market is more susceptible to noisy information than the option market and is therefore less efficient.

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1. Introduction

Are investors in different trading venues equally rational when it comes to reacting to noisy information? We attempt to answer this question in the case of stock and option markets by studying the differential response of stock and option-implied stock prices to the arrival of noisy information. It has been argued that the stock market should react to information quicker and more accurately than the option market because option prices rely on their underlying stock prices. Proponents of this hypothesis have investigated whether the stock market leads in information discovery using Granger causality and similar techniques. Many researchers consistently find no significant lead in the option market. For example, [Stephan and Whaley \(1990\)](#) find that option-implied stock prices cannot predict future stock returns. [Chan, Chung, and Johnson \(1993\)](#) analyze the lead–lag relation between stock and option markets, and find no evidence that option price changes lead stock price changes. Similar findings have been reported by [Diltz and Kim \(1996\)](#), [Finucane \(1999\)](#), [O'Connor \(1999\)](#), [Chan, Chung, and Fong \(2002\)](#), and [McIntyre and Jackson \(2009\)](#). Previous literature on implied volatilities in the option market also

documents short-horizon underreaction and long-horizon overreaction to information arrival (i.e., [Stein \(1989\)](#), [Potesman \(2001\)](#)).¹

Opponents of the “stock-leads-option” hypothesis suggest that option market may be the preferred habitat for informed trading due to the absence of short-sale constraints, built-in downside protection, and opportunities to exploit leverage.² If informed traders prefer the option market, the option prices should be less responsive to noisy information. [Manaster and Rendleman \(1982\)](#) are among the first to use option prices to predict prices in the underlying stock market. They suggest that option-implied stock prices represent the option market's assessment of the underlying asset's value, and that the option-implied stock prices contain information that is not fully reflected in actual stock prices. [Kumar et al. \(1992\)](#) document abnormal option returns prior to block trading in the underlying stock. [Easley, O'Hara, and Srinivas \(1998\)](#) use signed option trading volume to show that the option markets contain information about stock

¹ Other studies focus on the price discovery in the futures markets. For example, [Chen and Gau \(2010\)](#) find that spot foreign exchange rates provide more price discovery than the CME futures trades.

² See, for example, [Black \(1975\)](#), [Cox and Rubinstein \(1985\)](#), [Easley, O'Hara, and Srinivas \(1998\)](#), and [Chakravarty, Gulen, and Mayhew \(2004\)](#). After the SEC removed short-sale constraints in July 2007, the informational role of the option market could have changed. This is beyond the scope of this study.

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price changes. Research using “sequential-trade” models also suggests that informed traders trade in the option market.³

More recently, Chakravarty et al. (2004) show that about 17% of price discovery occurs in the option market. Of particular interest to this paper, Lamont and Thaler (2003) find that in the stock carve-out case of Palm/3Com, the actual price of Palm shares is considerably higher than the option-implied stock price for Palm in the option market. Ofek et al. (2004) also show that option-implied stock prices forecast future stock returns. Taylor, Yadav, and Zhang (2010) show that option forecasts are nearly always more informative for firms that have more actively traded options. Yu, Lui, and Wang (2010) find that option-implied volatility is superior to either historical volatility or GARCH type volatility forecasts. Most recently, Xing, Zhang, and Zhao (2010) find that the volatility smirk has a capacity for predicting future equity returns. Cremers and Weinbaum (2010) document that the deviations from put-call parity contain information about future stock price movements. They also find that option prices are more likely to deviate from put-call parity when underlying stocks face more information risk.

All of these recent findings are consistent with the notion that equity prices may reflect one set of beliefs while option prices reflect another. However, existing literature has not directly examined the comparative efficiency of trading behavior in the stock and option markets when noisy information is present. We aim to understand which market behaves more efficiently when stock and option markets diverge. Efficient trading behavior reveals market quality, and thus where informed traders are more likely to operate. Divergence between stock and option markets should signal the difference in beliefs between informed versus noise traders.

We test market quality (i.e., efficiency) based on the price pressure hypothesis first proposed by Scholes (1972). The price pressure hypothesis asserts that security prices may diverge temporarily from efficient information values. Uninformed shifts in excess demand compensate liquidity providers as prices return to equilibrium values. Past research has documented abnormal returns and trading volumes around the arrival of noisy information. Driven by noise trading from naïve investors, abnormal returns are reversed shortly thereafter.⁴ We gauge market quality by the strength of price pressure effects in response to noisy information in the form of recommendations made by CNBC's *Mad Money* flamboyant host Jim Cramer.⁵ We provide evidence that his buy recommendations are a good example of noisy information, and stock and option prices diverge as a result. However, his sell recommendations are more credible and no divergence between the stock and option market is observed.

Although *Mad Money* is popular among individual investors, the fact that it disseminates noisy information is known by investment professionals and some academics. Thus, *Mad Money* stock picks constitute a reasonable test for market rationality. If the option market responds to Mr. Cramer's recommendations similar to the stock market, we conclude that the option market possesses no quality advantage. If informed traders prefer the option market

and uninformed investors prefer stock trading, the stock price implied by the corresponding option (hereafter option-implied stock price) should exhibit significantly less price pressure than the observed stock price. In extreme cases, the option-implied stock price may even move in the opposite direction in response to noisy information.

Using the standard event time methodology,⁶ we examine trading behavior in the stock and option markets in response to Mr. Cramer's recommendations. Our final sample consists of 317 Cramer buy recommendations and 337 sell recommendations from July 2005 through April 2007 following deletion of inconsistent and news confounded observations.⁷ We document three major findings. First, for buy recommendations, in the presence of a price pressure effect, the option market behaves more efficiently than the stock market. A 2.92% abnormal stock return on the day after Mr. Cramer's buy recommendations suggests the existence of a price pressure effect in the stock market for small-cap stocks. This is consistent with other studies examining *Mad Money* effects on the stock market. These results are reversed during the ensuing two weeks. In contrast, the option-implied stock returns are significantly lower than the actual stock returns following the buy recommendations. This indicates that either the option market is less responsive to the noisy information than the stock market, or the option traders may actually trade against the naïve stock investors upon the arrival of Cramer's buy recommendations.⁸

On the other hand, Mr. Cramer's sell recommendations are more credible. The stock prices of sell recommendations drop for the following trading days without any price reversal. The option-implied stock returns move along with the actual stock returns without any significant deviation after the sell recommendations. Thus, Mr. Cramer's sell recommendations appear to be more trustworthy than his buy recommendations.

Second, we find that following the buy recommendations, bid-ask spreads in the option market decrease significantly and option trading volumes are abnormally high. The abnormal trading activity lasts for more than 5 days following the recommendations. This finding strengthens the abnormal price results, and it suggests that option market makers may narrow the bid-ask spreads in anticipation of reduced adverse selection bias resulting from the buy recommendations. Furthermore, abnormal trading activity is particularly strong for put options. This result is consistent with Chakravarty et al. (2004) and Xing et al. (2010) in that informed traders prefer to trade put options when the stock prices are expected to drop. For the sell recommendations, the bid-ask spreads in the option market also decrease on day +1. This is consistent with the notion that the sell recommendations disseminate information that reduces adverse selection bias. The option trading volume following sell recommendations increases, particularly for put options.

Third, we show that the abnormal divergence between the actual stock prices and option-implied stock prices due to buy recommendations could yield a maximum risk-adjusted return of 5.06% during the 30-day event period. This result is from the option-implied stock prices associated with out-of-the-money put options. It suggests that out-of-the-money put options are the best predictors of the price reversal pattern following the price pressure effect on day +1. Again, this finding supports the results in Xing et al. (2010). Out-of-the-money put options tend to convey

³ In “sequential-trade” models, informed traders can trade in either the stock or the option market. These models suggest that the amount of informed trading in option markets should be related to the depth or liquidity of both the stock and option markets, and the amount of leverage achievable with options. See, for example, Biais and Hillion (1994), Easley et al. (1998), Mayhew et al. (1995), and Pan and Poteshman (2006).

⁴ See, for example, Harris and Gurel (1986), Lynch and Mendenhall (1997), Wurgler and Zhuravskaya (2002), Mitchell, Pulvino, and Stafford (2002), Coval and Stafford (2004), Corwin (2003), Liang (1999), Carhart, Kaniel, Musto, and Reed (2002), Cohen, Gompers, and Vuolteenaho (2002), Hotchkiss and Strickland (2003), and Engelberg, Sassville, and Williams (2009).

⁵ The show's animated host, Jim Cramer, draws more than 398,000 viewers daily according to the Philadelphia Enquirer, January 8, 2006. Recent estimates provided by Nielsen range from 400,000 to 600,000. The show airs three times a day during weekdays at 6:00 pm, 9:00 pm, and 12:00 midnight.

⁶ We follow the event study design documented in Mikkelson and Partch (1988).

⁷ Indeed, the *Mad Money* show makes more buy recommendations than sell recommendations. However, more stocks are repeatedly recommended to buy and fewer stocks are repeatedly recommended to sell. Therefore, we have more first-time sell recommendations than first-time buy recommendations.

⁸ We also conduct the test based on the full sample (without deleting news confounded observations), and the results are qualitatively similar to those of the more restricted sample.

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