



Stock returns on option expiration dates: Price impact of liquidity trading



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ABSTRACT

This paper documents striking evidence that stocks with a sufficiently large amount of deeply in-the-money call options experience a significant return drop of 0.8 percentage point on option expiration dates; this price movement is then followed by a short-term reversal. We attribute the negative returns to the selling pressure from call option buyers who exercise deeply in-the-money calls and sell the acquired stocks immediately. This selling pressure is offset neither by parallel option writers' purchases nor by put option rebalancing on the opposite end.

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1. Introduction

Options were introduced into the Chicago Board Options Exchange (CBOE) on April 26, 1973. After 36 years, the option market has burgeoned, with the daily volume reaching more than 15 million contracts in 2010. As the option market grew, the number of optionable stocks also increased. By 2010, nearly two-thirds of all stocks traded on the New York Stock Exchange were optionable. This large fraction has given rise to an issue in the study of the financial markets—how options interact with the underlying stocks.

With a standardized contract, exchange-traded options expire at 10:59 pm Central Standard Time on the Saturday following the third Friday of each month. Because the option market as well as the stock market stops trading after closing on the third Friday and reopens on the following Monday, no transactions take place on the official option expiration date. Therefore, investors treat the third Friday as the expiration date.

The option expiration date has long been a day with vibrant trading activities. In the option market, evidence shows (see Fig. 2) that the total open interest of options remains at a similar level in the expiration week. This fact suggests that most investors wait until the expiration Friday to close their positions, and it gives rise to a large volume in the option market. As for the stock market, empirical evidence also documents an enormous increase in stock trading volume (Chiang, 2009; Stoll and Whaley, 1987, 1990).¹ This is true not only for stocks with many at-the-money and slightly in-the-money options but also for those with plenty of deeply in-the-money options. Chiang (2009) further verifies the causal link between this large increase in trading activities and option expiration. When an option contract expires on Saturday, any position on this contract automatically disappears, and this change in option position can trigger parallel trading in the stock market and can offset trades to close out the options themselves on the third Friday (the last trading day before expiration). For stocks with most of their options being

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¹ This figure plots the average open interest of in-the-money call options in each expiration week of 2006, with zero days to maturity as the expiration date (the third Friday of a calendar month).

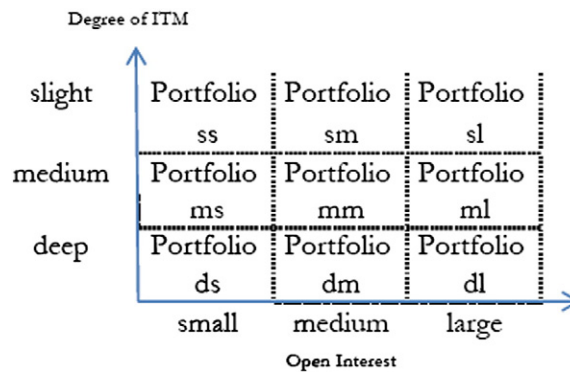


Fig. 1. Nine-stock portfolio based on option in-the-moneyness and open interest.

at-the-money or slightly in- or out-of-the-money, their volume surges, possibly due to vibrant delta-hedging rebalancing (this can be inferred from Ni et al. (2005)). However, for stocks with large numbers of deeply in-the-money call options, the considerable increase in trading volume may stem from option buyers selling off acquired stocks after exercising the calls on the expiration date. If such selling pressure is sufficiently large, we could observe negative price movements of these stocks on the third Friday.

In this paper, we investigate how trading activities in the stock market that stem from option expiration alter the distribution of the underlying stock price, even when no new information has been released to the market. Using stock portfolio returns, we provide striking evidence that stocks with large numbers of deeply in-the-money call options tend to earn significantly lower returns on option expiration dates. The drop in average daily returns between the Thursday before the third Friday and that Friday, reaches -0.8% per day. The returns remain significantly lower after adjusting for systematic risk. We also find that less-liquid stocks experience a stronger average price decline.

Following the low expiration-date returns, a full price reversal exists. The reversal is a distinct feature of the price–pressure hypothesis (PPH), and thus, the large-scaled negative price movement we observed should be generated as a result of selling pressure on expiration dates.

A potential source of the selling pressure is from call option buyers who exercise deeply in-the-money call options on the expiration date and sell the acquired stocks immediately. With market frictions, we provide evidence that exercising instead of selling the options is preferable to closing out the long-call position. As all equity options require physical delivery, call option buyers end up with stocks in hand. They then have a motive to sell these acquired shares immediately in the stock market. Plausible reasons for this strong propensity to sell the stocks include: the shortage of capital to exercise the options, a need for recovery of the original cash position, and portfolio rebalancing. These incentives to liquidate the newly acquired stock holdings increase the option buyers' demand for immediate liquidity and generate negative price pressure. The key reason this statement is likely to be true is that buying pressure from the call option writers should be relatively small, as a majority of the written call options are covered at initiation (Lakonishok et al. (2004, 2007); Merton et al., 1978). Additionally, call option writers who

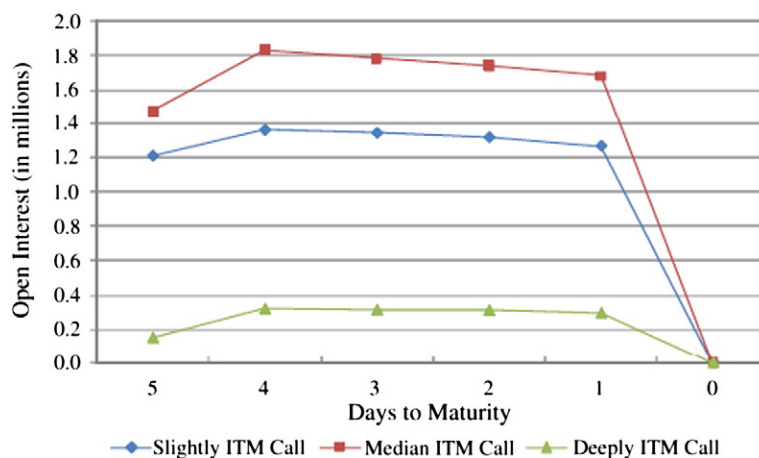


Fig. 2. Total open interest of in-the-money call options in option expiration weeks. This figure plots the average open interest of in-the-money call options in each expiration week of 2006, with zero days to maturity as the expiration date (the third Friday of a calendar month). Open interest is in numbers of option contracts.

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