



Why does the option to stock volume ratio predict stock returns?☆



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ABSTRACT

We use data on signed option volume to study which components of option volume predict stock returns and resolve the seemingly inconsistent results in the literature. We find no evidence that trades related to synthetic short positions in the underlying stocks contain more information than trades related to synthetic long positions. Purchases of calls that open new positions are the strongest predictor of returns, followed by call sales that close out existing purchased call positions. Overall, our results indicate that the role of options in providing embedded leverage is the most important channel why option trading predicts stock returns.

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1. Introduction

There has been long-standing interest in whether and how investors who possess valuable private information might use derivatives markets to execute trades based on that information. Recently, Roll, Schwartz, Subrahmanyam (2010) introduced to the literature a measure of the ratio

of option trading volume to stock trading volume (O/S) and empirically explored some of its properties. Their findings suggest that cross-sectional and time-series variation in O/S might be driven by informed trades. Johnson and So (2012) pursue this point and find that O/S predicts the returns of the options' underlying stocks over a one-week horizon, with high O/S predicting negative returns. They argue that "the negative relation between O/S and future returns is driven by short-sale costs in equity markets, which make option markets an attractive venue for traders with negative news." In their model explaining their empirical findings, Johnson and So (2012) emphasize the same role of options and argue that "the costs associated with short-selling make informed traders more likely to use options for bad signals than for good ones and, as a result, high O/S indicates negative private information and low O/S indicates positive private information."

The O/S ratio is constructed from unsigned option trading volume and can be high because option traders

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are establishing or closing out positions that involve either synthetic short or long exposure to underlying stock prices. Given that purchases of calls and sales of puts comprise about one-half of option trading volume, [Johnson and So's \(2012\)](#) finding and interpretation are surprising in light of previous research showing that option trades that create synthetic long exposure predict positive stock returns. For example, [Pan and Poteshman \(2006\)](#) find that high and low values of the put–call ratio computed from directional information about order flow predict low and high returns, respectively, suggesting that investors with positive information about stock prices trade on that information using options.³ One possible resolution of the apparent inconsistency might lie in the fact that the signed option order flow data used by [Pan and Poteshman \(2006\)](#) were not available to market participants, in contrast to the O/S ratio.

However, a recent empirical literature shows that price-based measures such as the implied volatility spread and implied volatility skew are able to predict future stock returns ([Cremers and Weinbaum, 2010](#); [Xing, Zhang, Zhao, 2010](#)), while other researchers explore the return predictability of these price-based measures around earnings announcements, corporate events, and events such as the initiation of analyst coverage and analyst recommendation changes ([Jin, Livnat, Zhang, 2012](#); [Lin and Lu, 2015](#); [Chan, Ge, Lin, 2015](#); [Hayunga and Lung, 2014](#)). This literature provides evidence that measures constructed from option prices contain positive as well as negative information about future stock prices. A similar conclusion can be drawn from [Cao, Chen, Griffin \(2005\)](#) who sign option order flow using a version of the Lee-Ready algorithm. In light of this evidence, it is puzzling why the O/S ratio predicts negative stock returns. As indicated above, purchases of calls and sales of puts comprise about half of option trading volume, and they predict positive returns.

In this paper, we reconcile the apparent inconsistency by exploiting data from the International Securities Exchange (ISE) on the signed option volumes of public customers to study which components of option order flow predict underlying stock returns. Similar to the OptionMetrics data used to compute the O/S ratio and in contrast to the data used by [Pan and Poteshman \(2006\)](#), the data we use are available to any market participants willing to pay the license fee. The data allow us to study whether option trades that provide synthetic short exposure to underlying stock prices are more informative than those that provide synthetic long exposure, as claimed by [Johnson and So \(2012\)](#). Our data are also disaggregated according to whether the signed volume comes from the opening of new option positions or the closing of existing positions.

Using these data, we find no evidence that option trades related to synthetic short positions in the underlying stocks are more informative than option trades that provide synthetic long exposure. The most informative

option volume is that due to trades that open new bought call positions, which we refer to as open buy call (OBC) volume. This result holds in all of the subsamples we examine and is robust to the specifications of the regression models. In our main results, the point estimates indicate that the second most informative component of option volume consists of option volume stemming from sell trades that close previously purchased call positions. Even though these are sales of calls, they do not involve synthetic short positions in the underlying stocks because they involve the closing of previously established long positions, not the establishment of new short positions. Meanwhile, open sell put (OSP) volume also predicts positive returns.

Unsurprisingly, we also find evidence that volume associated with new synthetic short positions in the underlying stock negatively predicts returns. But the finding that the O/S ratio negatively predicts returns is not driven so much by these components of volume as by the result that the unwinding of bought call positions also negatively predicts returns. That is, volume that opens synthetic short positions negatively predicts returns, and volume that opens synthetic long positions positively predicts returns, with larger coefficients. In addition, volume resulting from the unwinding of bought call positions also negatively predicts returns. Therefore, there are more components of option volume negatively predicting returns than positively predicting returns. Taken as a whole, our evidence indicates that option trades related to synthetic long positions in the underlying stock either contain about the same quantity of or more information than option trades related to synthetic short positions. Given the embedded leverage and information content are similar in both synthetic long and short positions, we can conclude that the short-sale costs do not play the most important role in explaining the stock return predictability of options trading volume. The embedded leverage is the most important channel why O/S predicts stock returns.

Meanwhile, compared with the opening trades, we find that closing trades are generally less informative, which is consistent with the findings in [Pan and Poteshman \(2006\)](#). The exception to the statement that closing trades are generally less informative is the significant predictability from volumes due to unwinding of bought call positions. This finding is unsurprising given that open buy call volume has the strongest predictive power among the various opening volumes. If open buy call volumes are the strongest predictor among the opening volumes, it is to be expected that the trading volumes that unwind these positions would be the strongest predictor among the closing volumes.

We obtain these results using weekly [Fama and MacBeth \(1973\)](#) regressions that include signed O/S measures (in decile ranks) constructed from the signed volume data plus a wide range of control variables. Our main results are based on a sample that excludes option expiration weeks because a large fraction of expiration week option volume is due to “rolling” of option positions into later expiring contracts, which might not reflect new information. When we examine expiration weeks separately, we do not find a significant relation between the overall O/S measure

³ The idea that the embedded leverage provided by options might be appealing to investors interested in long exposure to underlying stock prices dates at least to [Black \(1975\)](#).

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