

Understanding Options Activity and Strategies



A GUIDE FOR AN IRO

III IPREO

Ipreo Special Report

+1-877-588-5030 | sales@ipreo.com | www.ipreo.com

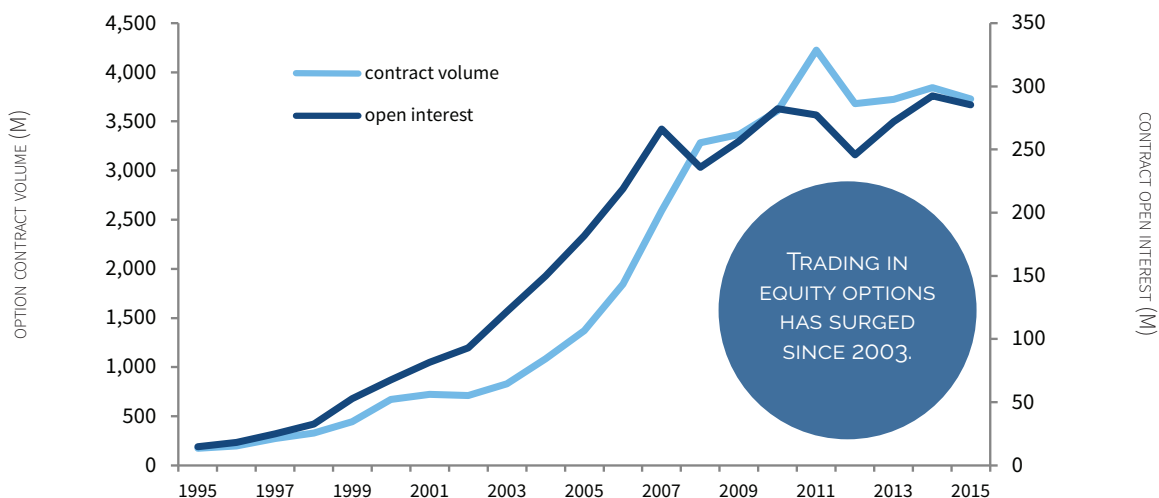
The World of Equity Options

THE INTRICATE WORLD OF EQUITY OPTIONS IS VAST AND CAN BE DIFFICULT TO DIGEST, BUT IT OFFERS VALUABLE INSIGHT FOR IROs AND THEIR EXECUTIVE TEAMS WHO ARE EQUIPPED TO PROPERLY INTERPRET THE DATA. THIS PAPER IS A GUIDE TO UNDERSTANDING THE RELEVANCE OF OPTIONS ACTIVITY.

Proper analysis of options trading can give IROs and management additional insight into current sentiment and the strategies of a stock's investors. As trading volume in equity options has surged since 2003 [SEE CHART 1 BELOW], issuers need to understand how analysis of options activity can provide awareness about how investors are thinking about present and future performance of the stock, and how investors are using options to hedge their current equity exposure.

Effective analysis of options activity requires consideration of the primary elements of the contracts being traded, which include price of the underlying stock, contract strike price, time until expiration, volatility, interest rates, and dividends. By examining these components, we can formulate reasonable conclusions about the motivations, expectations, and consequences behind certain patterns of options activity.

CHART 1: EQUITY OPTIONS CONTRACT VOLUME AND OPEN INTEREST



Source: Options Clearing Corp.

Key Findings

> An IRO can classify the intelligence to be gained from any specific options activity into several categories:

01

Sentiment and outlook on the underlying stock

02

Specific connections between options contracts and equity stock trades by investors, which are typically hedge funds

03

High-frequency options contract trading and short-term hedging noise that is less relevant to the IRO

The second category above is particularly noteworthy for the IRO, as investors can use the leverage that options offer to quickly build equity exposure. A few common options activity scenarios will demonstrate the insights available to an IRO.

We also discuss the value of data from commonly observed aggregated options activity. Metrics such as the put/call ratio and implied volatility may provide some clues about sentiment in a stock. However, their value for the IRO can be limited and possibly misleading under certain circumstances. We will explore some scenarios that show potential pitfalls associated with aggregated options metrics.

As we explore this topic, it is important to think about options in their proper context, as only a subset of the buy side is actually engaged in options activity. (See the Appendix for list of leading options contract holders.) Options trading typically does not figure into the modus operandi of the traditional institutional giants and mutual fund managers that most concern IROs. As such, analysis of options activity may not be a top priority for an IRO if Cap World, Fidelity, T. Rowe Price, Wellington, et al are not involved. However, analysis of options activity is an important data point in understanding the overall picture of what is happening in equity trading.

Sentiment and Outlook in the Underlying Equity



Some patterns in options activity provide insights about the current sentiment in a stock. We can typically form an opinion about sentiment by observing which contracts have elevated trading volume.

SCENARIO 1: INCREASED CALL VOLUME ON RISING STOCK PRICE

Investors with bullish sentiment typically buy calls when the outlook is good and the stock price is expected to rise. An investor may be looking to trade the contract as its premium increases in the short or long term. Also, bullish investors with the risk tolerance for dramatically increasing exposure to the stock will buy calls.

In early March, stock XYZ moves up from \$9.50 to \$10. The market sees heavy options volume and a premium increase in June \$12 calls. As the call premium rises \$0.10 to \$0.20, the IRO may speculate that an investor is anticipating XYZ to continue to move higher with a break-even point of \$12.20 (strike plus premium) before the third week in June. The IRO may also be able to tie this sentiment to a particular long hedge-fund investor if the firm typically uses derivatives and has been accumulating the stock. If XYZ then hits \$12.50 in May and the premium continues to rise, then we suspect that a long hedge fund holding the contracts may have sold the options taking profits, or rolled them into a different contract with a higher strike price. An IRO may be able to associate this activity to a hedge fund that discloses call options on its Form 13F and has been a recent accumulator of the stock.

SCENARIO 2: INCREASED PUT VOLUME ON FALLING STOCK PRICE

Investors with bearish sentiment typically buy puts if the stock's outlook is weak. The investor may be looking for a quick profit by trading the put contract as the premium increases. Purchasing puts is also equivalent to buying insurance for existing long underlying equity positions to hedge downside risk.

If XYZ falls from \$10 to \$9 in early March, contract volume increases on the \$8 June put while the contract premium rises from \$0.20 to \$0.50. An IRO can infer that sentiment is weakening and investors are hedging against the stock falling to \$7.50 (strike price less premium). An investor that bought XYZ at \$10 may be hedging its long position with the insurance policy of an \$8 put should the stock price drop below that level. If there is no open interest in the \$8 June put and volume in that contract spikes, then a hedge fund may be writing \$8 puts and collecting \$0.50. The contract writer will be forced to buy the stock if XYZ falls below \$8 when the contracts are redeemed. This move is the strategy of a hedge fund seeking to buy the stock on low valuation while collecting some premium. Another way of thinking about writing puts is that an investor is placing an \$8 buy limit order on XYZ stock. On heavier put volume, IROs should be looking for hedge funds that formerly liquidated the stock and are seeking an attractive re-entry point.

SCENARIO 3: COVERED CALLS (“BUY-WRITE”) INDICATING WEAK SHORT-TERM SENTIMENT

A covered call is a strategy whereby an investor buys the stock (typically a bullish trade), but hedges the move by simultaneously writing a call contract (typically a bearish trade). The investor has a long equity position, but may have a short-term neutral or bearish outlook and wants to hedge the investment by generating income by selling call contracts. Executing covered calls is one of the most common combination strategies for hedge fund investors who have been in the stock and typically trade around a core position. A covered call is also a good way for a hedge fund to initiate a position. Analysts can speculate that covered calls are active when activity spikes in call contracts where there is little or no open interest, because as a surge of contract volume where there is no existing open interest can only be newly written contracts.

XYZ is trading at \$10 in early March and a long hedge fund wants to increase its position but sees some near-term headwinds. The firm buys XYZ at \$10 and then writes April \$11 calls (thus, the “buy-write” label for this combination) at \$0.90 per contract. The call writer does not think that XYZ will exceed \$11 before April expiration, but the writer is in effect buying a \$10 stock for \$9.10 by applying the call premium to the stock purchase. The downside to this strategy is the limited upside potential, as the writer will be short the stock or will sell the long position at \$11.90 (strike plus \$0.90 premium). The IRO may be able to identify opportunistic hedge funds accumulating the stock in this scenario.

SCENARIO 4: MARKET-NEUTRAL SHORT-TERM VOLATILITY PLAYS

Recognizing market-neutral options trading patterns can help the IRO identify activity not representative of long equity investor sentiment. The “straddle” and the “strangle” are two of the most common volatility options plays.

The long straddle is a very common options trade that typically arises in stocks expecting large price movements in the underlying asset. An investor who thinks that XYZ at \$10 in early March is going to move up or down in the near term will simultaneously buy April \$10 calls and April \$10 puts. If the combined cost of both contracts is \$2, then the investor makes money above the break-even points of \$12 to the upside and \$8 to the downside before expiration.

The long strangle is another volatility play similar to the straddle, but the strangle uses out-of-the-money contracts and can be initiated at a lower cost. An investor who thinks that XYZ at \$10 in early March will experience volatility could buy April \$12 calls and April \$8 puts. If the combined cost of the contracts is \$0.50, then the break-even points are \$12.50 to the upside and \$7.50 to the downside.

For both of these strategies, the investor may not have a bullish or bearish outlook on the stock, but is simply betting that the stock will move significantly one way or the other. Straddles and strangles often originate from quant shops, day traders, and short sellers trading off short-term market sentiment. Based on disclosures in 13F filings, some of the typical names we suspect behind this activity include passively managed, quantitative hedge funds D.E. Shaw and Citadel.

Do Investors Use Listed Options to Build Long Equity Positions?

Investors are capable of accumulating equity positions over a period of time by using long-dated call options known as LEAPS (Long-Term Equity Anticipation Securities), which typically have expiration dates of a year or more. If XYZ in March 2016 is trading at \$10, an investor can claim the right to purchase 1 million shares of exposure by buying 10,000 January \$15 2018 LEAPS contracts, an investment that requires a much lower capital commitment than purchasing the stock outright. Investors can also buy long-term downside insurance with put LEAPS. Issuers can monitor increases in open interest of LEAPS for clues if an investor is building a call position, or if an existing equity investor appears to be settling in for the long haul with puts.

Many IROs are concerned about activist investors building a position through options. Note, however, that many recent activist moves with derivatives have been executed in the OTC market and cannot be observed in open trading of listed contracts. For example, over the period 10/28 – 11/20 in 2015, activist hedge fund Elliott Management accumulated 35.97m shares of Alcoa (AA) via physically settled swaps in the OTC market, representing almost half of the shares it eventually disclosed on its Form 13D. This type of OTC activity is not disclosed until the filing comes out and cannot be observed in open trading.

Some known activists use options contracts to buy equity, but this kind of trade may be only a small part of a broader strategy. For example, activist investor Bill Ackman said on Pershing Square's Q116 earnings call that while the firm has "used options over a long period of time, options have generally been a relatively small percentage of our overall capital." It appears that at least some of the firm's well-publicized 9% Valeant stake is hedged with options, but was not built by converting calls. Instead, Pershing Square wrote puts to buy the stock cheap, as described in Scenario 2.

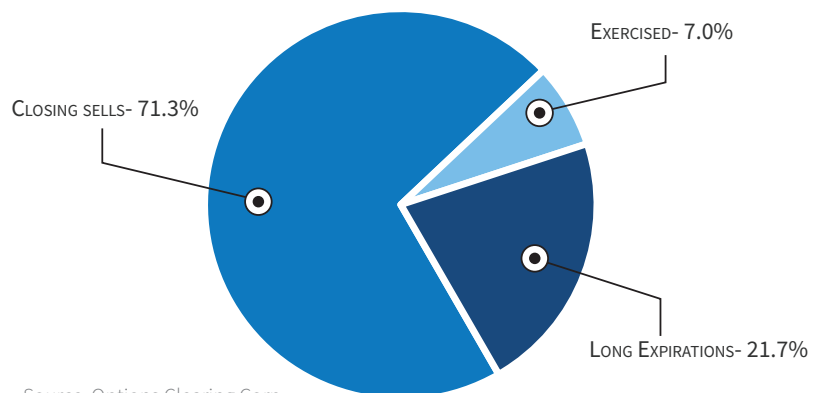


"Valeant options where we debated, do we buy the stock outright, or is it more sensible in light of volatility to sell puts and buy calls?... Our ultimate view here is the January \$60 strike put options we've sold to finance the calls we purchased, in this case, are likely to expire out of the money, or we're acquiring the stock at a price that, in our view, is a very, very low valuation for the business."

-Pershing Square Q116 earnings call Q&A

Note that only a small percentage of listed options volume gets converted to an equity position [CHART 2]. Data from Options Clearing Corp. show that in 2015, 93% of options contracts were not exercised and were traded back and forth in the run-up of trading volume to almost 4 billion contracts. Most contracts (71.3%) actually end up being closed by brokers before expiration, while 21.7% expire and are not converted to equity via puts or calls. Last year, only 7% of all contracts were actually exercised.

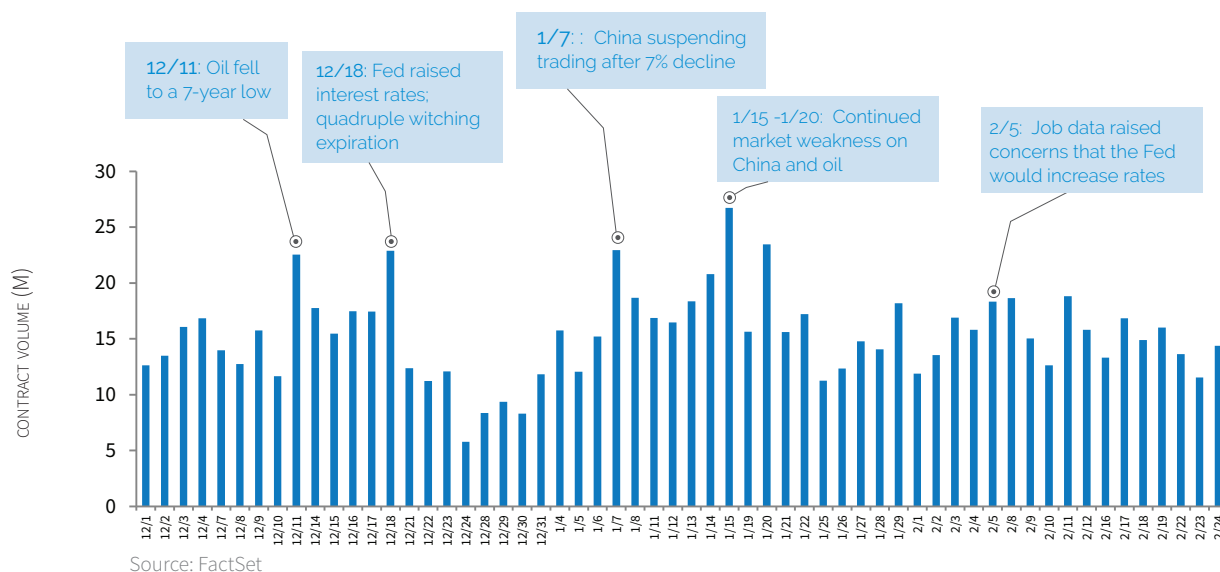
CHART 2: WHAT HAPPENED TO OPTIONS CONTRACTS IN 2015?



Source: Options Clearing Corp.

Moreover, we typically observe most options contract volume is traded in near-term expiration contracts and during periods when stocks tend to be volatile, like around earnings calls or market-wide announcements that induce short-term shocks to trading. Note that spikes in contract volume during recent trading sessions appear to have been prompted by broad-based market sentiment amid higher volatility, as investors rushed to place bets on future stock performance. Much of this volume increase is represented by contracts being tossed back and forth over and over again within milliseconds. Note the surges in options contract volume over the volatile Dec. 2015 – Feb. 2016 period when oil prices, interest rates, and concerns about growth in China were dominating the headlines [CHART 3].

CHART 3: EQUITY OPTIONS CONTRACT VOLUME DEC 2015 – FEB 2016



Outside of the near-term volatility trades, some options activity is connected to investors exercising contracts to equity in advance of contract expiration. The primary reason for exercising a contract early is to capture the stock’s dividend, using near-expiration contracts that meet the criteria below. An investor can use call options to secure the dividend for a profit when the dividend is greater than the interest expense of converting the contracts and buying the shares early. These contracts are typically executed the day before the stock’s ex-dividend date. Dividend stocks in the telecom, utilities, energy, and banking sectors tend to see this activity frequently.

CALL OPTION	PUT OPTION	EXERCISE OCCURS WHEN...
In-the-money	zero value	dividend > interest expense of buying shares early
In-the-money	value > 0	dividend > put price + interest expense of buying shares early

Case Studies of Recent Options Activity

CASE STUDY #01: EXAMPLE ANALYSIS OF YUM

Yum Brands (YUM) is a hedge fund-heavy stock that experienced elevated options activity in January 2016. YUM saw modest gains and crept back over \$70 during the 1/11-1/14 period after reporting improved same-store sales in China.

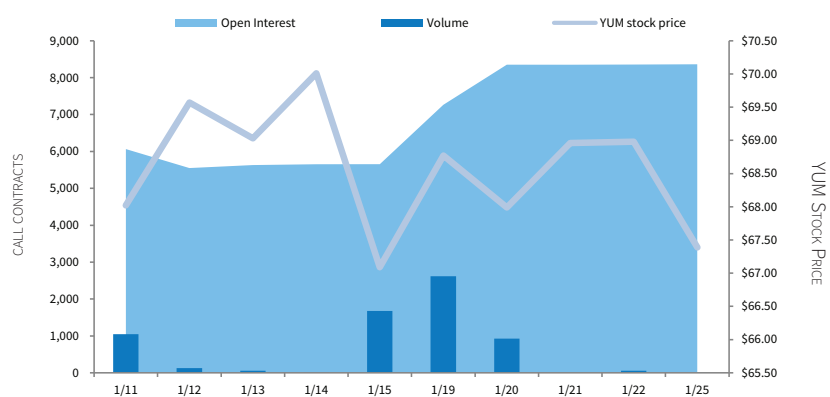
However, the stock then sharply dropped on 1/15 amid a broader-market selloff on a steep decline in oil prices. In the 1/15 and 1/19 sessions, YUM February \$75 calls became active. Because the open interest in that contract spiked, we know that those were newly written contracts [CHART 4].

Who would be motivated to write near-term \$75 calls on a pullback in the stock? A good possibility is that a hedge fund with a long YUM position and who has been accumulating the stock wanted to take in premium to help offset downside risk, and is expecting continued short-term weakness on the poor broader market sentiment.

The hedge fund could have used a covered call strategy to increase its position and also gained income by collecting the premium on the calls. (The buying pressure in the stock also likely drove the 2.5% rebound on 1/19.) The hedge fund's expectation was that the stock would not recover to the \$75 level before February expiration.

Several leading YUM hedge fund holders who actively use derivatives fit the profile behind this activity, including Third Point, ESG, Eminence, Senator, and Hoplite. Another possibility is that a hedge fund is looking to opportunistically build its YUM exposure back up after selling aggressively. Note that Form 13Fs by hedge funds Balyasny and Laurion show derivative positions in YUM, and both firms have a history of churning YUM equity positions. Using covered calls is a terrific way to hedge risk while re-initiating an equity position.

CHART 4: YUM FEB \$75 CALLS

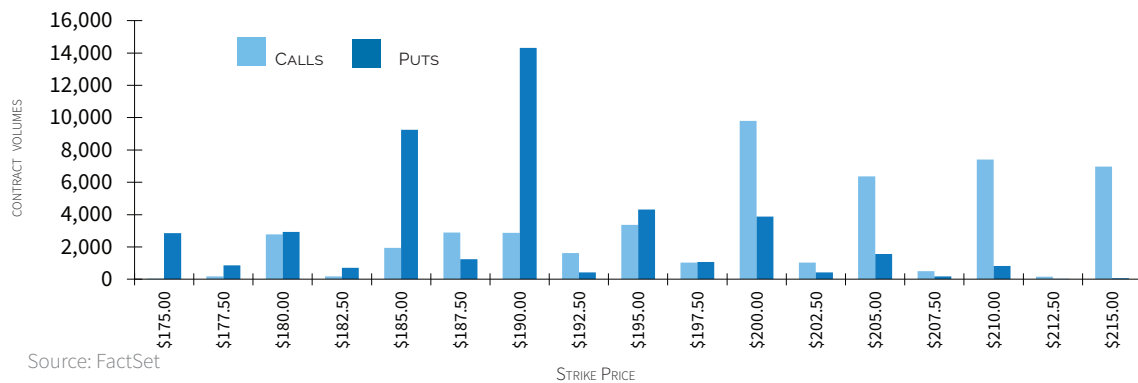


Source: FactSet

CASE STUDY #02: EXAMPLE ANALYSIS OF GS

In August 2015, Goldman Sachs (GS) stock was trending above \$200, but then started to slide after it agreed to a settlement with the SEC regarding the potential risks of mortgage securities. A few days later, growth fears about China sent the stock and the major averages dramatically lower. Options activity in near-term \$190 puts surged over this period as investors looked to capitalize on the stock's weakness [CHART 5]. Equity hedge fund investors such as Citadel and D.E. Shaw who hold GS puts may have sought downside protection.

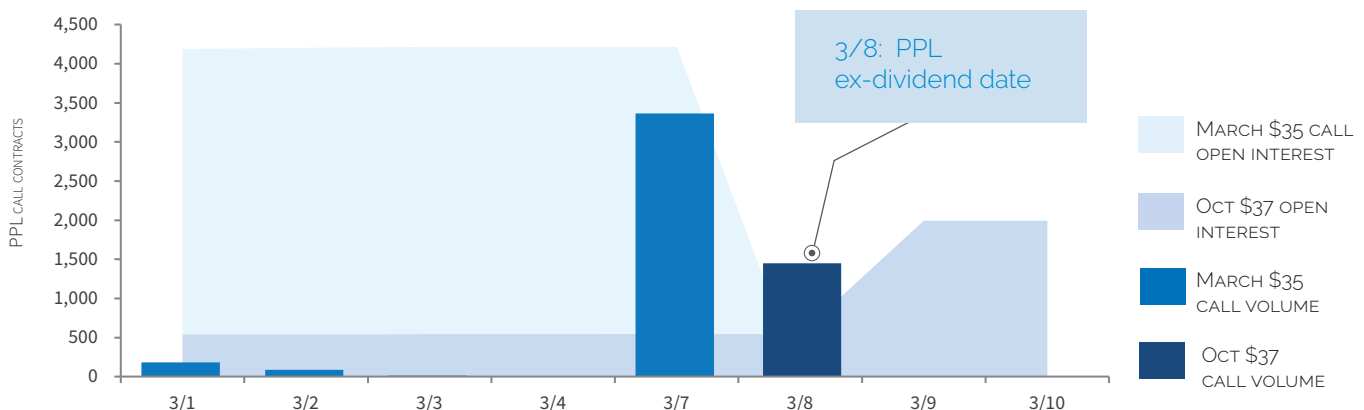
CHART 5: AUGUST 2015 GS OPTIONS ACTIVITY EXPIRATION: SEPTEMBER 2015



CASE STUDY #03: EXAMPLE ANALYSIS OF PPL

Utilities sector stock PPL pays an attractive 4.0% yield, and the stock regularly sees higher activity in call contracts in advance of its ex-dividend date [CHART 7]. In March 2016, an investor bought over 3,300 March \$35 call contracts on 3/7, the day before the stock went ex-dividend on 3/8, and then exercised them all, becoming eligible for the dividend payment with over 330k shares owned. Note that the contracts were still more than two weeks away from expiration, but dividend payment exceeded the time value on the contracts. The following day, 1,450 new October \$37 calls traded, perhaps bought by the same investor who was setting up for another dividend capture for later in the year.

CHART 7: PPL CALL OPTION ACTIVITY MARCH 2016



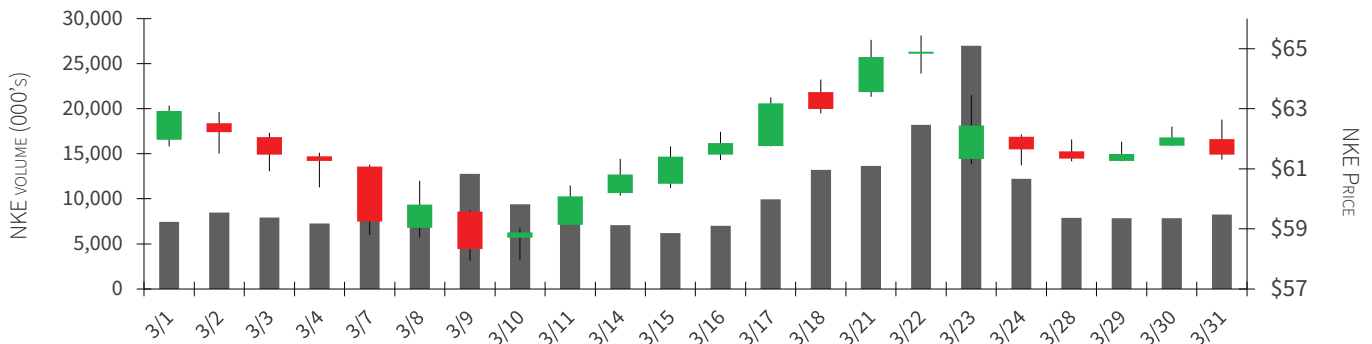
Case Studies of Recent Options Activity

Continued...

CASE STUDY #04: EXAMPLE ANALYSIS OF NKE

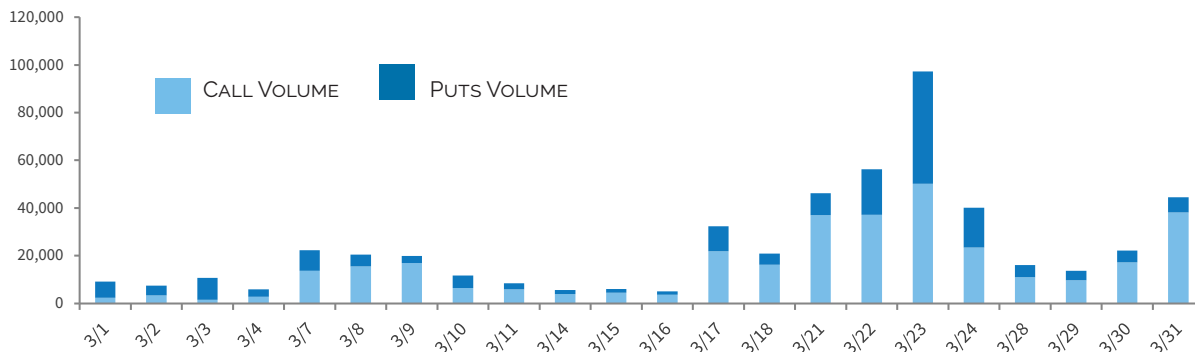
In March 2016, options activity in Nike (NKE) started surging heading into its earnings announcement on 3/22. Analysts expected solid earnings, and out-of-the-money calls were trading with higher volume on the stock's bullish price pattern over the 3/17–3/22 period before the announcement [CHARTS 6A AND 6B]. However, revenues missed expectations and the company reported softer-than-expected sales growth. NKE lost 3.8% on much higher volume on 3/23, accompanied by a surge in put activity on downside expectations. Options volume typically increases around the trading volatility of an earnings release or other announcement.

CHART 6A: NKE EQUITY PRICE AND VOLUME



Source: FactSet

CHART 6B: NKE OPTIONS CONTRACT VOLUME



Source: FactSet

Aggregate Metrics of Options Activity

Options activity analytics that examine market-wide contract activity can yield some insights about what is going on with the underlying stock. However, this information may not necessarily yield clear conclusions for the IRO because it is difficult to tie the data to an investor profile or to glean the sentiment of a stock's investors. Also, these metrics generally ignore key components of the contracts, like strike price and expiration, that provide meaningful intelligence about why the options activity is relevant.

Put/Call Ratio

Some options analysts place heavy importance on the put/call ratio, which the old wisdom suggests is an indicator of investor sentiment in the markets. Because puts are contracts that give holders the right to sell stock, an increase in the put/call ratio is seen as a bearish indication. In general, this assertion is true, but it can also be extremely misleading under certain circumstances. The only thing this ratio compares is the volume of puts being traded versus the volume of calls being traded, with no insight about what is the sentiment behind the trading. Heavy put activity can be either bullish or bearish, depending on the contract strike price and where the stock is trading, but the put/call ratio does not account for that crucial distinction. Furthermore, the put/call ratio does not provide any information about the expirations of the options being traded, so there is no insight about the timeframe of the sentiment.

For example, let's say that XYZ fell from \$30 to \$25 during March, and during that time, put activity spiked, as brokers aggressively wrote \$24 puts in response to their clients' requests for bearish puts and/or downside

protection on their long XYZ stock positions. Then in April, XYZ staged a sharp comeback back above \$30, and the premium on the \$24 put contracts dropped sharply. The put holders aggressively selling the contracts in April will drive an increase in the put/call ratio, signaling a bearish market, but the sentiment in the stock at this time is actually very positive. Alternatively, an investor who believes that the stock has bottomed could aggressively write \$24 puts and use the premium to buy the stock at a discount. This activity would also drive the put/call ratio higher amid bullish strength in the stock.

Here is a look at the put/call ratio versus price performance over the last three years in Apple (AAPL) and MasterCard (MA), two hedge fund-heavy stocks with very active options markets. Note that there is very little correlation between the stock's session performance and the put/call ratio. If this metric were an effective measurement of sentiment, we would see negative performance much more regularly when the put/call ratio is high, but that is not the case here [CHART 8A AND 8B].

CHART 8A: AAPL DAILY PRICE CHANGE VS. PUT/CALL RATIO
3 YEARS TRAILING AS OF 5/17/16

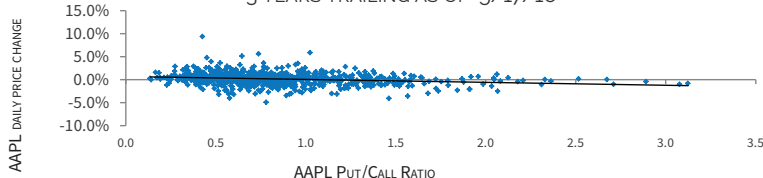
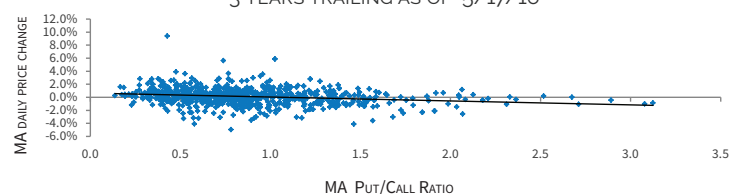


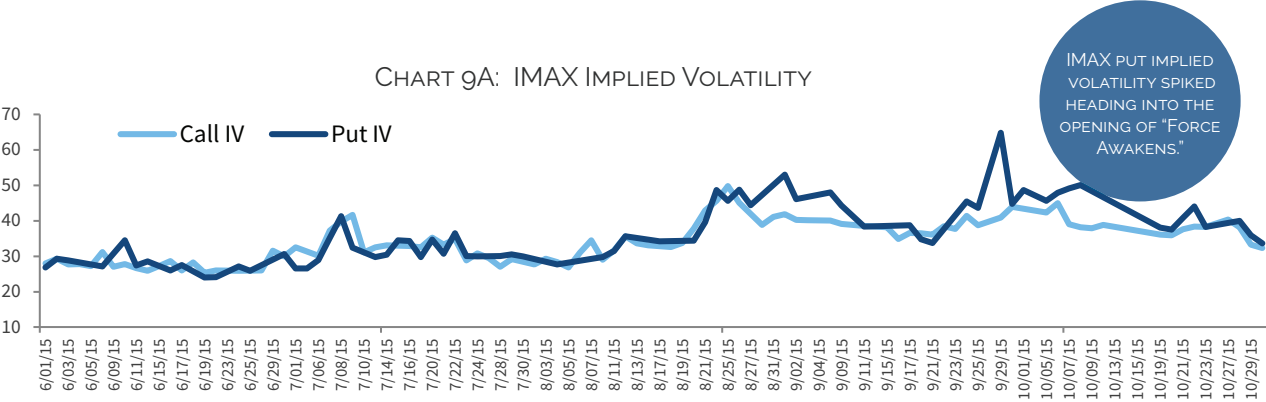
CHART 8B: MA DAILY PRICE CHANGE VS. PUT/CALL RATIO
3 YEARS TRAILING AS OF 5/17/16



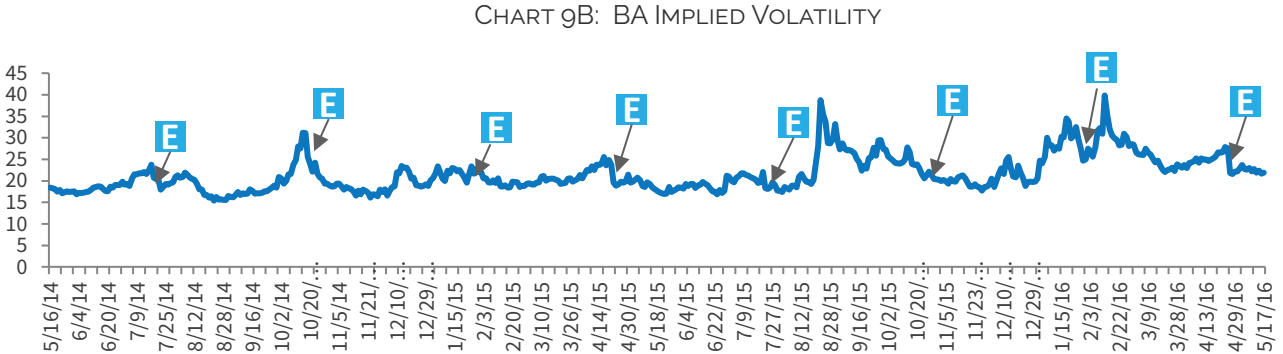
Source: FactSet

Implied Volatility

Implied volatility is a forward-looking measurement of market consensus that estimates the likelihood a stock will trade plus-or-minus one standard deviation away from its current price over the next twelve months. The number is simply offering a comment on volatility, but not a specific outlook on the stock. An increase in volatility may make an investment in the stock riskier in the short term, but there is not necessarily a connection with bullish or bearish sentiment. However, knowing the market is skittish over an upcoming earnings reports, because implied volatility is higher versus previous earnings report, can be useful because it may indicate a level of uncertainty that might be addressed with further communication from the issuer. Implied volatility in IMAX put options spiked when the market buzzed with interest about the upcoming Star Wars blockbuster [Chart 9A]. Boeing (BA) has seen some dramatic price reactions over its last few earnings calls, and its implied volatility has often seen surges leading up to the announcements [CHART 9B]. Implied volatility can be a helpful metric when combined with other data points, such as options volume, stock performance, recent buyers and sellers, commentary from the buy and sell side on the investment thesis, and current news flow.



Source: FactSet



Source: FactSet

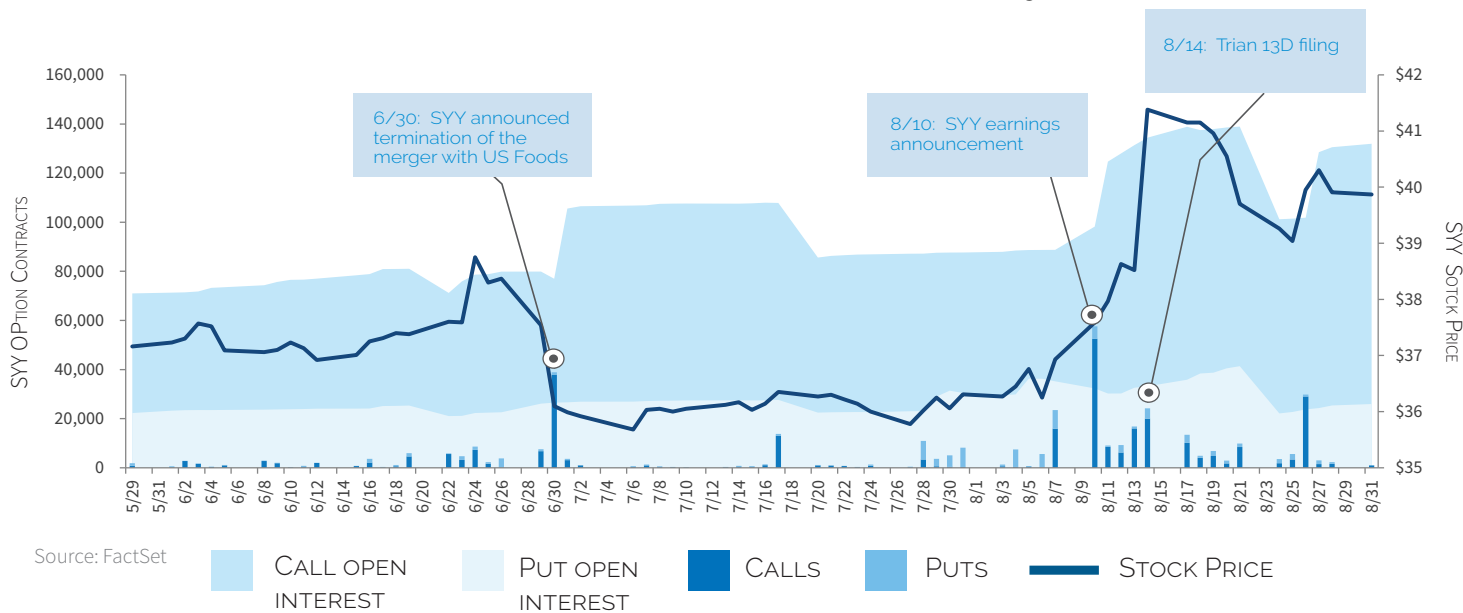
Options Insight in Context

Analysis of options activity can provide valuable insight for the IRO, provided that the context is meaningful and specific, and not based on vague metrics or opaque methodologies. Some options market observers may inflate the relevance of a sudden increase in options activity. For example, a surge of 100,000 call options traded might prompt a claim that an activist hedge fund now has potential exposure to a 10-million share position in the stock. While theoretically possible, this premature conclusion does not consider the myriad of possible alternative scenarios. Are the calls long-dated? What is the delta? Are there corresponding puts, indicating a market-neutral volatility hedge? Is a bearish options trader simply collecting premiums by writing naked calls? While the activist scenario is conceivable on paper, we cannot be confident in the narrative without appropriately researching the primary elements of the contract activity.

Consider the case of SYSCO (SYY) in 2015 [CHART 10]. On 6/30, the company announced that its much anticipated mega-merger with US Foods was canceled, and options volume spiked on the news as investors prepared for volatile trading. Six weeks later, hedge fund Trian filed a 13D disclosing a 7.1% activist stake. An untrained or speculative analyst might have drawn a straight line connecting the options volume surge with an activist position. Understanding what actually happened, on the other hand, requires analysis of both the options and equity trading. The bulk of the 6/30 options traded were new November \$39 calls, possibly being written by SYY-holding hedge funds and brokerages like Citadel and/or Susquehanna who were expecting a negative reaction to the announcement. These investors wanted to remain long in the equity, but saw the opportunity to hedge the position in the short term by writing calls and gaining income from the contract premium (see Scenario 3). Options activity also showed short-term speculators trading near-the-money July \$38 calls, looking to generate small and quick profits (see Scenario 1). As it turned out, these strategies turned out to be prescient, as the stock consolidated throughout July and into August. What options analysis did not illuminate, in this case, was the actual accumulation by Trian. In fact, the hedge fund's 13D filing explicitly stated that its use of hedging with options came from "privately negotiated back-to-back call and put transactions," i.e., the firm was not using listed contracts that could be observed in trading by options analysts. On the other hand, a hedge-fund accumulation representing a dominant ownership stake like this one would be fairly easy to pick up through stock surveillance. Intelligence analysts can monitor aggressive inflows into the accounts where activist hedge funds typically hold shares in custody.

Options trading analysis also provided intelligence around the trading landscape after SYY's earnings announcement (8/10) and when Trian's 13D was published (8/14), as contract volume and open interest spiked once again. On the 8/10 earnings announcement, SYY's quarterly revenue missed estimates, and the company said that "the go-forward trajectory for the industry growth" was "unclear." Investors reacted with a near-term bearish strategy by writing out-of-the-money September \$38 and November \$39 calls. However, sentiment turned bullish on 8/14 when August \$41, \$42, and \$43 calls were active following the activist's 13D filing.

CHART 10: SY Y OPTIONS AND EQUITY ACTIVITY JUNE-AUG 2015



These examples show how analysis of options activity can provide an effective narrative for what is happening in trading. Listed options contract volume may be driven by short-term options traders and electronic churn by quant shops seeking thin margins on momentum, and these players have little to do with the investor base IROs and their management teams care about. The high-frequency trading trend that has come to dominate equity markets also thrives in the options market. However, the examples described in this paper show that identifying certain explicit patterns through proper analysis can provide IROs with actionable intelligence about sentiment in a stock and hedged moves by equity investors.

An IRO should understand what insights can and cannot be gleaned from options activity alone, because options analysis represent only one piece of the intelligence puzzle regarding a stock's trading and its institutional investors. This paper shows that options activity analysis plays an important complementary role, but not necessarily a comprehensive one, as these insights taken in conjunction with equity stock surveillance provide the IRO with the best actionable intelligence. Data from options trading are just one of many signals the IRO should look to for actionable information. Because traditional investment managers who dominate shareholder lists generally do not participate in trading options, the intelligence obtained from what happens in equity trading is the preferred driver of IR strategy.

Appendix

Glossary

Option:

A contract providing for the right, but not the obligation, to buy or sell an underlying financial instrument, like a stock.

Strike price:

The fixed price at which the owner can buy or sell a security.

Premium:

In exchange for the right to buy or sell an underlying security on or before expiry the buyer pays a premium/debit.

Intrinsic value:

The amount the stock price is above or below the strike price.

Time value:

The option premium minus intrinsic value.

Expiration:

The last date that an options contract is valid.

Implied volatility:

The expectation that is priced into individual options using a model.

Delta:

The amount of change in the price of an option in relation to the underlying.

Open interest:

The total number of options and/or futures contracts that are not closed or delivered.

Early exercise:

Enables the option buyer the right to purchase (call) or sell (put) the underlying security before expiration.

Options Contract Holders >\$1 billion at 12/31/15

INSTITUTION	CALLS	CALL CONTRACT VALUE (\$M)	PUTS	PUT CONTRACT VALUE (\$M)	TOTAL CONTRACTS	TOTAL CONTRACT VALUE (\$M)	INSTITUTION TYPE
Citadel Advisors, LLC	1,393	11,214	1,273	11,164	2,666	22,379	Hedge Fund
Parallax Volatility Advisers, L.P.	564	8,466	544	9,509	1,108	17,975	Investment Advisor-Mutual Fund
D.E. Shaw & Company, L.P.	557	7,390	560	9,785	1,117	17,175	Hedge Fund
UBS Financial Services, Inc. (Inv Advisor)	405	6,289	371	10,779	776	17,068	Investment Advisor
Laurion Capital Management, L.P.	167	4,894	140	3,742	307	8,636	Hedge Fund
Spot Trading, LLC	980	3,729	827	3,683	1,807	7,412	Proprietary
Group One Trading, L.P.	1,060	3,607	977	3,332	2,037	6,938	Proprietary
PIMCO - Pacific Investment Management Co.	174	583	261	5,904	435	6,486	Investment Advisor-Mutual Fund
OZ Management, L.P.	61	2,949	78	2,524	139	5,473	Hedge Fund
Soroban Capital Partners, L.P.	11	2,860	4	1,863	15	4,723	Hedge Fund
HSBC Global Asset Management (U.K.), LTD	199	1,889	202	2,658	401	4,546	Investment Advisor-Mutual Fund
Pentwater Capital Management, L.P.	19	1,152	21	3,185	40	4,336	Hedge Fund
Capital Fund Management S.A.	287	2,292	269	1,804	556	4,097	Hedge Fund
Jane Street Capital, LLC	448	2,167	332	1,372	780	3,538	Proprietary
Bluefin Trading, LLC	142	1,425	174	1,441	316	2,866	Proprietary
Masters Capital Management, LLC (U.S.)	32	2,583	1	10	33	2,594	Hedge Fund
Pomelo Capital, LLC	5	5	80	2,219	85	2,223	Hedge Fund
HBK Investments, L.P.	33	1,453	40	706	73	2,160	Hedge Fund
Gruss Capital Management L.P.	15	1,505	8	340	23	1,845	Hedge Fund
CMT Asset Management, LTD	62	792	61	895	123	1,686	Proprietary
U.S. Trust, BofA Private Wealth Management	10	946	21	619	31	1,565	Investment Advisor
Capstone Investment Advisors, LLC	52	905	36	643	88	1,549	Hedge Fund
Valtura Capital Partners, LLC	10	197	31	1,240	41	1,437	Hedge Fund
Scout Capital Management, LLC	4	101	11	1,228	15	1,329	Hedge Fund
Millennium Management, LLC	126	795	70	501	196	1,296	Hedge Fund
PSP Investments	15	687	6	607	21	1,293	Pension Fund-State/Government
Westchester Capital Management, LLC (NY)	2	24	25	1,145	27	1,169	Investment Advisor-Mutual Fund
Two Sigma Investments, LLC	195	498	217	642	412	1,140	Hedge Fund
LMM, LLC	3	1,126			3	1,126	Investment Advisor-Mutual Fund
Highbridge Capital Management (UK), LTD	257	529	278	568	535	1,097	Hedge Fund
Tourbillon Capital Partners, L.P.	23	919	9	173	32	1,092	Hedge Fund
Invus Public Equities Advisors, LLC	33	1,088			33	1,088	Investment Advisor
York Capital Management Global Adv., LLC	13	1,003	2	60	15	1,063	Hedge Fund
MapleLane Capital, LLC	6	194	32	816	38	1,010	Hedge Fund



FIND OUT MORE ABOUT IPREO

We work as an extension of our clients' Investor Relations team

Ipreo is a leading global provider of financial services technology, data and analytics. We support all participants in the capital-raising process including banks, public and private companies, institutional and individual investors, as well as research, asset management and wealth management firms. Our extensive suite of investor relations services provides our corporate clients with unparalleled cross-asset class surveillance, investor targeting, buy-side perception studies, transaction analysis and predictive analytics. Additionally, Ipreo's BD Corporate IR workflow platform offers the most accurate and comprehensive database covering global institutional contacts, profiles, and ownership data. Our critical insights and flexible solutions help our clients run more effective investor relations programs. Ipreo is private-equity held by Blackstone and Goldman Sachs Merchant Banking Division, and has more than 1000 employees supporting clients in every major financial hub around the world.

www.ipreo.com