GLOBAL VOLATILITY SUMMIT

JUNE 2015 NEWSLETTER

Dear Investor,

The Global Volatility Summit ("GVS") brings together volatility and tail hedge managers, institutional investors, thought-provoking speakers, and other industry experts to discuss the volatility markets and the roles volatility strategies can play in institutional investment portfolios. The GVS aims to keep investors updated on the volatility markets throughout the year, and educated on innovations within the space.

Société Générale is kicking off our summer series of GVS Newsletters with a piece titled "Options Know Something That You Don't". Their Equity Derivatives Strategy group provides insightful analysis into the ability of options to forecast stock moves, specifically around earnings dates.

Stay tuned for more newsletters, educational materials and updates on the next event!

Cheers,

Global Volatility Summit

2015 EVENT RECAP

The 2015 event took place on March 11th at Chelsea Piers. It was attended by some of the world's largest pensions, endowments, foundations, sovereign wealth funds and banks, and sponsored by hedge fund manager participants, global banks and exchanges. We appreciate everyone's continued support and look forward to another great event in 2016.

EVENT THEME

Innovation and technology were the key themes of the event with a focus on how technology and science augment the way we live, work and trade.

KEYNOTE AND GUEST SPEAKERS

Kevin Slavin, Algoworld expert from MIT gave a keynote address on how algorithms shape the world.
Brad Katsuyama, President and CEO of IEX, shared his story behind pioneering trading technologies.

MANAGER PARTICIPANTS

BlueMountain Capital
Capstone Investment Advisors
Capula Investment Management
Dominicé & Co. – Asset Management
Fortress Investment Group
Ionic Capital Management
JD Capital Management
Parallax Volatility Advisors
Pine River Capital Management
Saiers Capital

For Institutional Investors Only

Important Notice: The circumstances in which this publication has been produced are such that it is not appropriate to characterise it as independent investment research as referred to in MiFID and that it should be treated as a marketing communication even if it contains a research recommendation. This publication is also not subject to any prohibition on dealing ahead of the dissemination of investment research. However, SG is required to have policies to manage the conflicts which may arise in the production of its research, including preventing dealing ahead of investment research.

THEMATIC

Options know something that you don't

Historical analysis of options' effectiveness in forecasting stock moves on earnings dates

Equity Derivatives Strategy
Vincent Cassot
(33) 1 42 13 59 55
vincent.cassot@sgcib.com

Siddhartha Pandey
(91) 80 6716 8492
siddhartha.pandey@sgcib.com

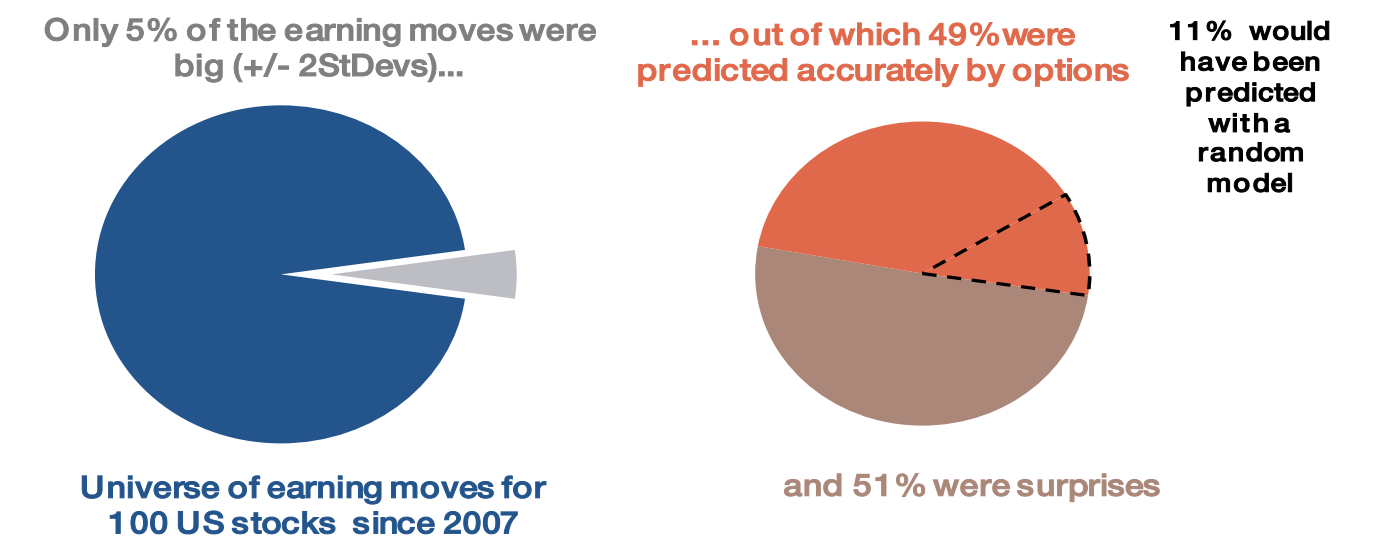
- **In the endless quest for leading indicators, the options market has long been seen as a highly promising area**. The idea is that option pricing parameters (volatility, term structure, skew etc.) reveal valuable information about investors' expectations. It is the non-linearity of option payoffs together with the choice of strikes and maturity that bring value, as they can be used to trade more complex scenarios than a pure delta-1 strategy.

- **In this report, we discuss the specific case of option pricing around earnings dates and examine if the shape of the volatility term structure adds value in the forecast of the stock move post earnings release.** We apply the well-known technique of expected implied move to a global universe of US and European stocks' earnings releases since 2007 and compare the outcome with the effective post-earnings moves.

- **Options help in identifying the big movers.** We find that the use of the implied move with a simple methodology vastly increases the chance of correctly forecasting future big movers (up or down) on earnings dates. It is 3.4 times (and up to 4.5 times in the US) more effective than a random approach.

- **The options market correctly forecasts the global distribution of earning moves.** The stocks for which the options market predicts big/median/small moves do indeed, on average, witness big/median/small moves, respectively. However, our study also highlights that the larger moves tend to be overpriced while the small moves tend to be underpriced.

How implied moves calculated from options pricing can help to forecast big moves around earning dates (for US stocks)



Source: SG Cross Asset Research/Derivatives

Societe Generale ("SG") does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that SG may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision. **PLEASE SEE APPENDIX AT THE END OF THIS REPORT FOR THE ANALYST(S) CERTIFICATION(S), IMPORTANT DISCLOSURES AND DISCLAIMERS.**

Is there value in options pricing data around earning dates?

■ In the endless quest for leading indicators, the options market has long been seen as a highly promising area. The idea is that option pricing parameters (volatility, term structure, skew etc.) reveal valuable information about investors' expectations. It is the non-linearity of option payoffs together with the choice of strikes and maturity that bring value, as they can be used to trade more complex scenarios than a pure delta-1 strategy.

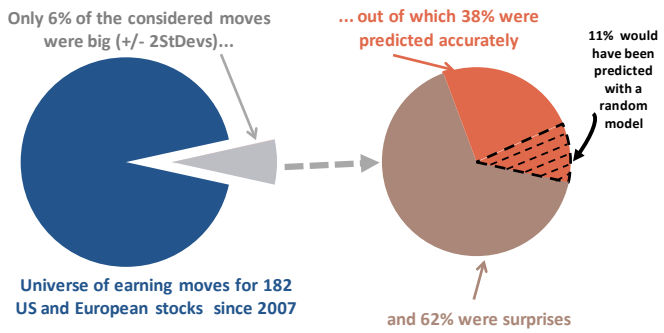
On this basis, we recently launched a new report series – "Implied Move Radar" (see an example here) – in which we identify the stocks with abnormal expected implied moves on the next earnings dates in comparison with their historical average moves, for all stocks in the STOXX Sector Indices with liquid listed options. We now explore the historical effectiveness of the forecasts by studying a universe of 182 US and European stocks, looking in detail at their expected and effective moves on earning dates since 2007.

Two complementary methods to study the predictive power of options pricing

We use two complementary methods to judge the model's performance. First, we review its ability to predict large moves (that we define as rare events, i.e. above 2 standard deviations from their historical mean) and compare the results with a random approach. Our study shows that the use of options information vastly increases (from 2.6 times in Europe and up to 4.5 times in the US) the odds of finding big movers. While the improvement is material, we discovered that option markets tends to overprice systematically the earnings moves, as only 21.3% of our candidates finally proved to be big movers.

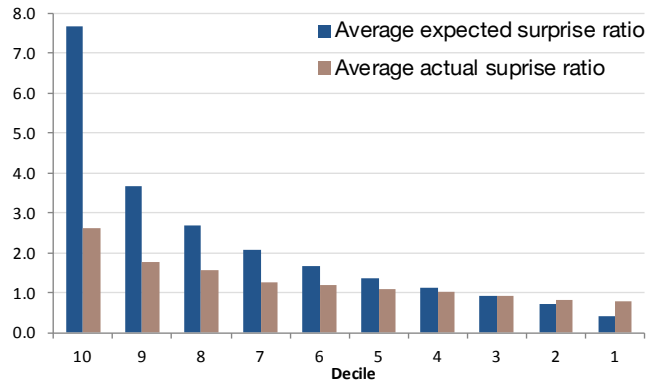
In a second step, we review the forecasts of the model not only for big movers but for the overall distribution of expected moves, to assess whether the mispricing is constant outside the rare events. We compare the rank of an *Expected Surprise Ratio* (expected move divided by average historical move) with the one of the corresponding *Actual Surprise Ratio* (effective move divided by historical move). We find that, on average, the options market correctly forecasts the global distribution of the effective move. Additionally, the overshoot decreases for normal moves and even shifts into a systematic underpricing for the small moves. Interestingly, we did not find any strong seasonal bias in the type of quarterly results (Q1, Q2 etc.).

Considerably greater chance of identifying big movers



Source: SG Cross Asset Research/Derivatives

Options market correctly forecasts the range of earning moves



Source: SG Cross Asset Research/Derivatives

Forecasting the big movers

Focusing on the tail events

We first focused on the capacity for option markets to correctly forecast the potential big and unusual moves (up or down) around the earnings release dates. This is a crucial point as gauging the expectations of the market could allow investors to avoid being exposed to a big disappointment in companies earnings (if they are long the stock) or to a large positive surprise (if they are short). Additionally, options practitioners could evaluate the potential of a long or short straddle position. In that perspective, the "options expectation" could be useful in the investor toolkit if it proves to be better than a random approach.

A word on the methodology

We start by defining what a big move is. In our view, it must be a rare event, notwithstanding the volatility of the stock. So we define it as a move which is above the average of the absolute return on the earnings dates +2 Standard Deviations. For each stock, we use the complete series of historical earnings moves available at each earnings date and transform this into a log of absolute returns, to calculate the threshold at mean+2StDev.

We then compare the expected move to the threshold: if the expected move is above, we consider that market is expecting a big move. After the earnings release, if the actual move is effectively above the threshold, we then consider that the market forecast was accurate, and if the actual move is below, we consider that the market forecast was incorrect. We finally compare our score (number of accurate forecasts/number of actual big moves) with the score that a random approach would have provided (number of actual big moves/size of the sample) x (number of big moves forecast).

Options help in identifying the big movers but generally find too many candidates

The charts and the tables below summarise our results.

Options model considerably increases the chances of correctly predicting big moves

	Total no. of cases considered	Effective big moves	Expected big moves	Effective among expected big moves	Random model: Expected big moves	Added value vs Random
Universe (US + Europe)	3,329	208	374	79	23	x3.4
US	1,884	87	207	43	9	x4.5
Europe	1,445	121	167	36	13	x2.6

Source: SG Cross Asset Research/Derivatives

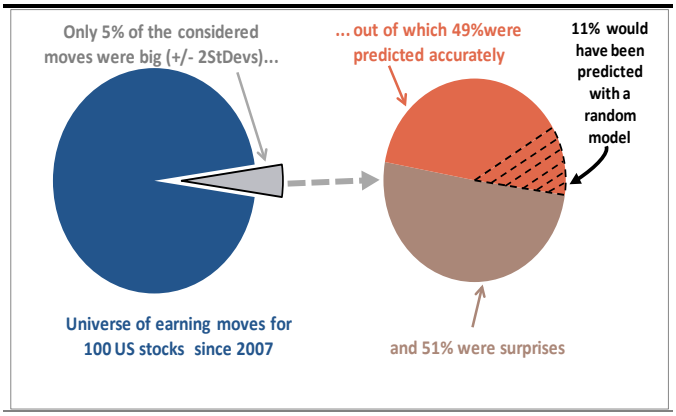
Out of the 3,329 earning moves that have been analysed, 208 (6.2%) can be effectively qualified as big moves. Our method highlighted 374 potential large moves, out of which 79 (21.3%) are effectively big moves. So the method has increased by 3.4 the number of identified actual big moves (a random approach would have found only 23 – compared to 79 - in a 374 similar sample).

The method works much better in the US than in Europe, with an increase of 4.5 times vs the random approach in the US and only 2.6 times in Europe. Among the possible explanations, we think that the higher level of transparency in the US (better financial communications from companies due to their longer experience in publishing quarterly results) and greater liquidity in the options market in the US (leading to more accurate levels of implied volatility) are the most likely.

The implied move, as calculated through options ATM volatility is by nature expressed in absolute terms and does not provide any pointers on direction. Running our study we have

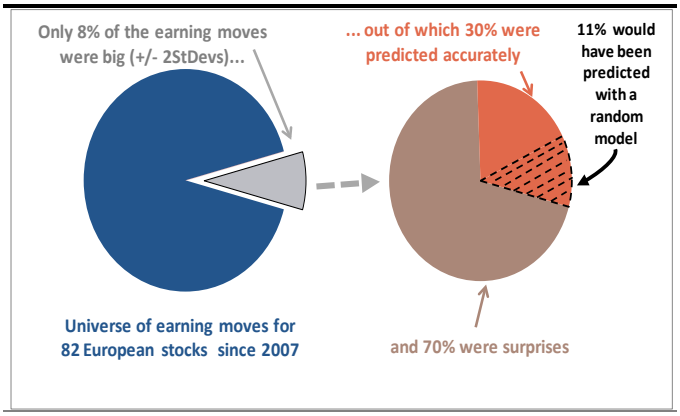
not been able to identify a clear trend on the directionality. Large effective moves on earnings dates are almost equally distributed between upside and downside and the model is equally successful in forecasting positive and negative surprises.

Results on US stocks are very encouraging



Source: SG Cross Asset Research

…while results on European stocks are a bit less impressive



Source: SG Cross Asset Research

While the improvement is material when compared to the random approach, we note that the options market tends to overprice the large earning moves, as only 21.3% of our candidates finally proved to be big movers. We now discuss whether this overpricing is specific to the large moves or if it occurs for smaller absolute returns as well.

Forecasting the range of earning moves

Assessing the predictive power outside big moves

In this second part, we do no longer focus on the rare big moves, but try to assess how reliable the methodology is in forecasting any kind of moves, whether small, median or large. We also check if the results are skewed by type of earnings announcements (Q1, Q2 etc.). Lastly, we discuss if the model works irrespective of the date of the analysis relative to the announcement date.

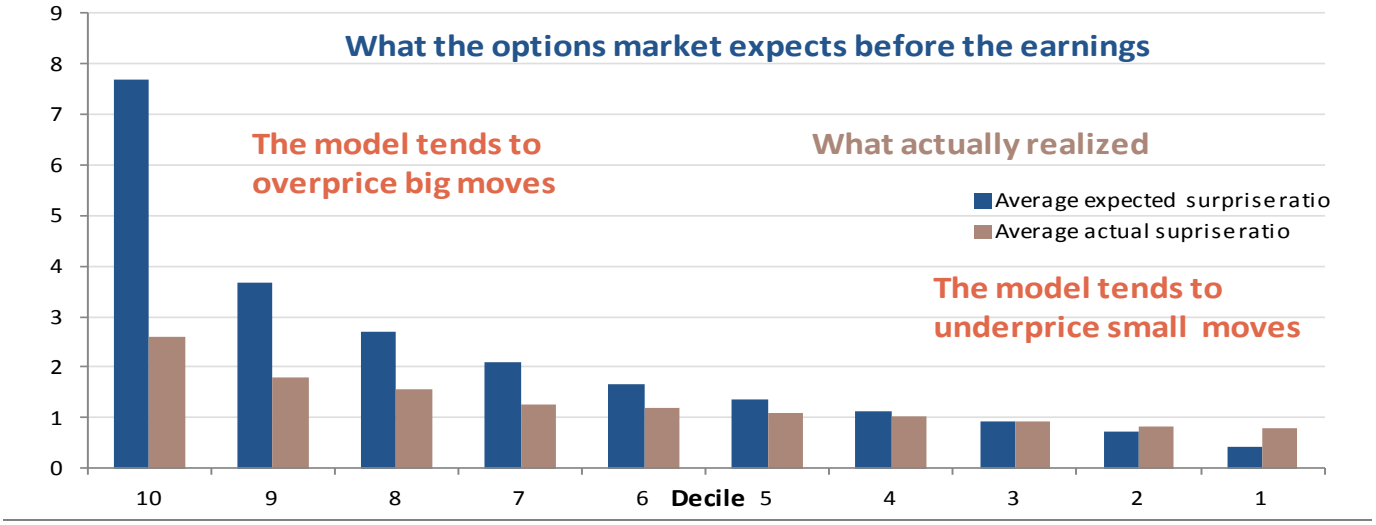
A word on the methodology

The key parameter is the comparison between what we define as the *Expected Surprise Ratio* (expected move divided by average historical move over the past 4 earnings announcements) and the corresponding *Actual Surprise Ratio* (effective move divided by historical move). Once we have calculated all the *Expected Surprise Ratios* we rank the data in deciles (with the 1st decile representing the smallest ratios and the 10th decile representing the highest). Then for each decile we calculate the average *Expected Surprise Ratio* and the corresponding *Actual Surprise Ratio*.

Model is indeed efficient in forecasting the implied moves

Representing the results in the chart below makes them easier to understand. For each decile, the blue bars represent the average of the *Expected Surprise Ratios* of the component of the decile while the brown bars represent the average of the *Actual Surprise Ratios* for the same components.

Options market correctly forecasts the range of earnings moves but overprices large moves and underprices small moves



Source: SG Cross Asset Research/Derivatives

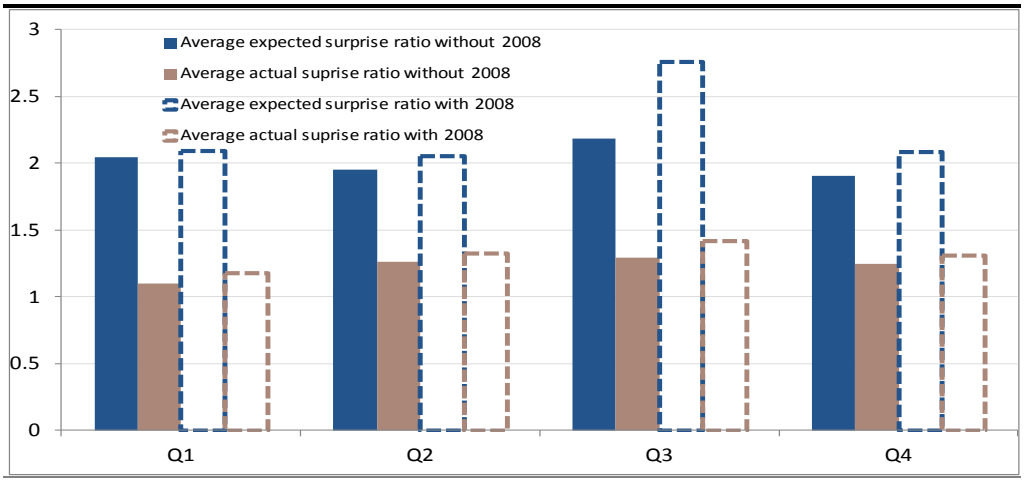
As evident from the chart, the relative size of the move is constantly predicted in line with the realised move (i.e. big or small). This implies our model is able to predict if the effect of the earnings announcement is going to be more or less pronounced than what it has been on average over the last 4 earnings dates.

Although the trend is correct, the absolute magnitude of the move seems to be mispriced by our model. The model overprices not only the very large moves (as highlighted in the first section) but most of the deciles (until the 4th). Interestingly, it also underprices the stock-price variability for the smallest moves (2nd and 1st deciles).

The model works for all types of announcements and has no seasonality bias

While the model results are efficient in predicting the range of implied moves it was also important to check that it works for all types of announcements, i.e. Q1, Q2, Q3 and Q4. The premise lies in the theory that the importance of the numbers released depends on the type of announcement i.e. Q1/Q2/Q3/Q4. One might assume that Q4 (annual results) followed by Q2 (semi-annual results) carry more importance as some European companies announce only semi-annual and annual results, and also probably because market participants are more concerned and anxious about these types of earnings announcements than they are for the others. In this analysis, we segregate our results based on the earnings announcement type and then compare the corresponding average expected surprise ratio to the respective average actual surprise ratio.

Model performs consistently across the four quarters



Source: SG Cross Asset Research/Derivatives

As seen in the chart above, the average expected surprise ratio is fairly stable throughout the four quarters and so is the average actual surprise ratio. With the expected and actual surprise ratios not differing much across the various earnings type, we can conclude that the options market and the cash market do not really accord any particular importance to the specific type of announcement. It should be noted that a big spike is observed in the expected surprise ratio for Q3 if we include the data for 2008. This is because Q3 earnings are usually disclosed in October and November and in 2008 those two months were the most volatile, which systematically affected implied moves.

Additional interesting results

Furthermore, while the above analysis (and all other analysis in this report) was performed 5 days before the announcement date, the model results imply the same conclusion irrespective of the number of days before the announcement date when we carry out our analysis. For example, an analysis done 7 days before results is very similar to that seen for an analysis conducted 15 days before the announcement. Finally, we also notice that the results improve globally when we remove the data for the highly volatile period of 2008.

Addendum

Calculating the implied move

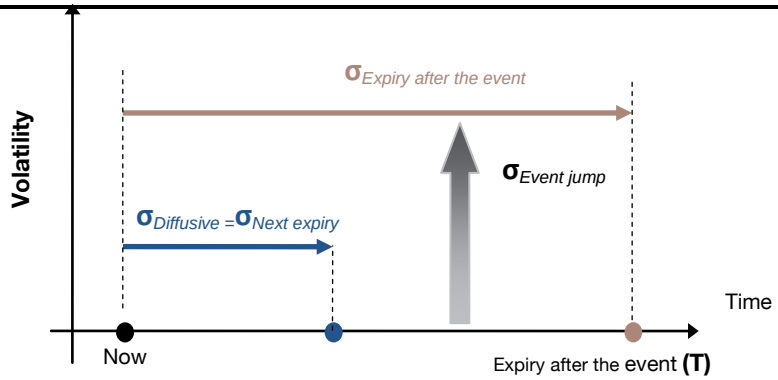
Our approach uses option prices to gauge the market's expectation of the extra volatility arising from the likelihood of unanticipated earnings figures. We calculate "earnings jump volatility" by comparing the known implied volatilities of ATM options for the next two expiries and strip out normal volatility ('diffusive vol') to compute 'jump vol' and the implied spot move on earnings day.

Terminology & sample calculation

▪ **Diffusive volatility:** Diffusive volatility can be assumed to be the normal volatility of a stock in the absence of an event for which any material information is expected. Examples of such events could include earnings announcements and litigation outcomes. Diffusive volatility can be estimated by looking at the implied volatility of the expiries following/before an event.

Case 1: If the event falls after the next (first) expiry, diffusive vol is simply the ATM vol of this expiry.

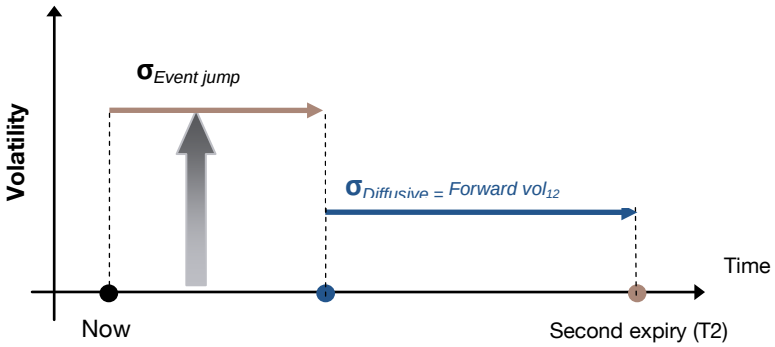
If the event falls after the next expiry



Source: SG Cross Asset Research/Derivatives

Case 2: If the event falls before the next (first) expiry, diffusive vol can be assumed to be forward vol, i.e. the volatility of a forward starting option (starting at the next (1st) expiry and maturing at the expiry following (2nd)).

If the event falls before the next expiry



Source: SG Cross Asset Research/Derivatives

This can be easily computed using the concept that variance is additive. To compute the forward volatility between time period T1 and T2:

$$\text{Forward Vol } \sigma_{12} = \sqrt{[(\sigma^2_2 T_2 - \sigma^2_1 T_1)/(T_2 - T_1)]}$$

▪ **Event jump volatility:** Event jump volatility is the extra volatility resulting from market expectations related to a given event. It can be calculated by stripping out diffusive volatility from the implied volatility of the expiry right after the event. Once again we use the additive properties of variance.

Here we assume that there is one day of event-driven jump vol, whereas as the remaining (T-1) days from T day to the next expiry have the normal or the diffusive vol.

$$\sigma^2_{\text{expiry after the event}} T = \sigma^2_{\text{diffusive volatility}} (T-1) + \sigma^2_{\text{event jump vol}} 1$$

$$\rightarrow \sigma^2_{\text{event jump vol}} = (\sigma^2_{\text{expiry after the event}} T - \sigma^2_{\text{diffusive volatility}} (T-1))$$

▪ **Implied spot move on earnings day:** The implied spot move can be calculated using event jump volatility as shown above. Since event jump vol is annualised, we de-annualise it to calculate the event day vol as σ_(event day vol) = ⟦σevent jump vol⟧_ /√256. We then use the price of a 1 day straddle (with the implied volatility as the event day vol) to calculate the implied spot move as:

Implied Spot Move = 2 * 1/√2π * event day vol ≅ 0.8*event day vol

Comparing the expected and the realised earning moves

Once we have calculated the implied move, the next step is to compare the implied move to the realised move for the universe of stocks in consideration. In our analysis, we compare the two moves in terms of their ratios rather than their spreads. We feel the ratio that signifies the move relative to the average spot move is a better indicator of the efficiency of our model than the standalone magnitude of the move. For example, a 10% implied move is big relative to an average move of 0.5% but is not remarkable for a stock whose average spot move is 7%.

We compare our own built Expected Surprise Ratio (implied move expected by options market divided by the average absolute stock move on the past 4 earning dates) for each earnings date with the Actual Surprise Ratio (realised move on the earnings date divided by the average stock move on the past 4 earning dates).

For example, let us assume our model forecasts an absolute spot move of 4% for stock XYZ which has moved 3%, -2%, 0% and -5% on the day of last 4 announcements. So in this case, the expected surprise ratio is calculated as:

$$Expected\ surprise\ ratio = \frac{4\%}{\text{average}(|3\%|, |-2\%|, |0\%|, |-5\%|)} = \frac{4\%}{2.5\%}\ i.e.\ 1.6$$

Similarly we calculate the actual surprise ratio using the actual spot move post the announcement.

Once we have all the expected surprise ratios we rank the data in deciles with the lowest decile (1st decile representing the expected surprise ratios which were the smallest) and the highest decile (the 10th decile representing the ones which had the highest expected surprise ratios). Then for each decile we calculate the average expected surprise ratio and the corresponding actual surprise ratio. The backtest data can then be compared easily either mathematically or visually through bar charts.

APPENDIX

ANALYST CERTIFICATION

The following named research analyst(s) hereby certifies or certify that (i) the views expressed in the research report accurately reflect his or her or their personal views about any and all of the subject securities or issuers and (ii) no part of his or her or their compensation was, is, or will be related, directly or indirectly, to the specific recommendations or views expressed in this report: **Vincent Cassot**

The analyst(s) who author research are employed by SG and its affiliates in locations, including but not limited to, Paris, London, New York, Dallas, Hong Kong, Tokyo, Bangalore, Mumbai, Frankfurt, Madrid, Milan, Seoul, Warsaw and Moscow.

SG EQUITY RESEARCH RATINGS on a 12 months period (in effect as of March 14, 2012)

BUY: absolute total shareholder return forecast of 15% or more over a 12 month period.

HOLD: absolute total shareholder return forecast between 0% and +15% over a 12 month period.

SELL: absolute total shareholder return forecast below 0% over a 12 month period.

Total shareholder return means forecast share price appreciation plus all forecast cash dividend income, including income from special dividends, paid during the 12 month period. Ratings are determined by the ranges described above at the time of the initiation of coverage or a change in rating (subject to limited management discretion). At other times, ratings may fall outside of these ranges because of market price movements and/or other short term volatility or trading patterns. Such interim deviations from specified ranges will be permitted but will become subject to review by research management.

Prior to the change in SG Equity Ratings on March 14, 2012, the SG Equity Ratings in effect were: BUY (expected upside of 10% or more over a 12 month period; HOLD (expected return between -10% and +10% over a 12 month period); and SELL (expected downside of -10% or worse over a 12 month period).

Sector Weighting Definition on a 12 months period:

The sector weightings are assigned by the SG Equity Research Strategist and are distinct and separate from SG equity research analyst ratings. They are based on the relevant MSCI.

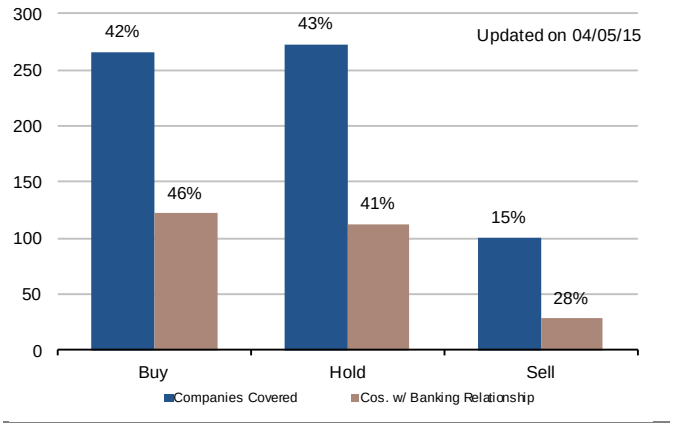
OVERWEIGHT: sector expected to outperform the relevant broad market benchmark over the next 12 months.

NEUTRAL: sector expected to perform in-line with the relevant broad market benchmark over the next 12 months.

UNDERWEIGHT: sector expected to underperform the relevant broad market benchmark over the next 12 months.

The Preferred and Least preferred stocks are selected by the covering analyst based on the individual analyst's coverage universe and not by the SG Equity Research Strategist.

Equity rating and dispersion relationship



Source: SG Cross Asset Research/Equity

All pricing information included in this report is as of market close, unless otherwise stated.

MSCI DISCLAIMER: The MSCI sourced information is the exclusive property of Morgan Stanley Capital International Inc. (MSCI). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced, redisseminated or used to create any financial products, including any indices. This information is provided on an "as is" basis. The user assumes the entire risk of any use made of this information. MSCI, its affiliates and any third party involved in, or related to, computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the information have any liability for any damages of any kind. MSCI, Morgan Stanley Capital International and the MSCI indexes are service marks of MSCI and its affiliates or such similar language as may be provided by or approved in advance by MSCI.

FOR DISCLOSURES PERTAINING TO COMPENDIUM REPORTS OR RECOMMENDATIONS OR ESTIMATES MADE ON SECURITIES OTHER THAN THE PRIMARY SUBJECT OF THIS RESEARCH REPORT, PLEASE VISIT OUR GLOBAL RESEARCH DISCLOSURE WEBSITE AT http://www.sgresearch.com/compliance.rha or call +1 (212).278.6000 in the U.S.

European Specialty Sales
If a European specialist sales personnel is listed on the cover of research reports, these employees are in SG's Global Markets division responsible for the sales effort in their sector and are not part of SG's Cross-Asset Research Department. Specialist Sales do not contribute in any manner to the content of research reports in which their names appear.

The analyst(s) responsible for preparing this report receive compensation that is based on various factors including SG's total revenues, a portion of which are generated by investment banking activities.

Non-U.S. Analyst Disclosure: The name(s) of any non-U.S. analysts who contributed to this report and their SG legal entity are listed below. U.S. analysts are employed by SG Americas Securities LLC. The non-U.S. analysts are not registered/qualified with FINRA, may not be associated persons of SGAS and may not be subject to the FINRA restrictions on communications with a subject company, public appearances and trading securities held in the research analyst(s)' account(s): Vincent Cassot Société Générale Paris, Siddhartha Pandey Société Générale Bangalore

IMPORTANT DISCLAIMER: The information herein is not intended to be an offer to buy or sell, or a solicitation of an offer to buy or sell, any securities and has been obtained from, or is based upon, sources believed to be reliable but is not guaranteed as to accuracy or completeness. Material contained in this report satisfies the regulatory provisions concerning independent investment research as defined in MiFID. Information concerning conflicts of interest and SG's management of such conflicts is contained in the SG's Policies for Managing Conflicts of Interests in Connection with Investment Research which is available at https://www.sgresearch.com/Content/Compliance/Compliance.aspx SG does, from time to time, deal, trade in, profit from, hold, act as market-makers or advisers, brokers or bankers in relation to the securities, or derivatives thereof, of persons, firms or entities mentioned in this document and may be represented on the board of such persons, firms or entities. SG does, from time to time, act as a principal trader in equities or debt securities that may be referred to in this report and may hold equity or debt securities positions. Employees of SG, or individuals connected to them, may from time to time have a position in or hold any of the investments or related investments mentioned in this document. SG is under no obligation to disclose or take account of this document when advising or dealing with or on behalf of customers. The views of SG reflected in this document may change without notice. In addition, SG may issue other reports that are inconsistent with, and reach different conclusions from, the information presented in this report and is under no obligation to ensure that such other reports are brought to the attention of any recipient of this report. To the maximum extent possible at law, SG does not accept any liability whatsoever arising from the use of the material or information contained herein. This research document is not intended for use by or targeted to retail customers. Should a retail customer obtain a copy of this report he/she should not base his/her investment decisions solely on the basis of this document and must seek independent financial advice.

The financial instruments discussed in this report may not be suitable for all investors and investors must make their own informed decisions and seek their own advice regarding the appropriateness of investing in financial instruments or implementing strategies discussed herein. The value of securities and financial instruments is subject to currency exchange rate fluctuation that may have a positive or negative effect on the price of such securities or financial instruments, and investors in securities such as ADRs effectively assume this risk. SG does not provide any tax advice. Past performance is not necessarily a guide to future performance. Estimates of future performance are based on assumptions that may not be realized. Investments in general, and derivatives in particular, involve numerous risks, including, among others, market, counterparty default and liquidity risk. Trading in options involves additional risks and is not suitable for all investors. An option may become worthless by its expiration date, as it is a depreciating asset. Option ownership could result in significant loss or gain, especially for options of unhedged positions. Prior to buying or selling an option, investors must review the "Characteristics and Risks of Standardized Options" at http://www.optionsclearing.com/about/publications/character-risks.jsp or from your SG representative. Analysis of option trading strategies does not consider the cost of commissions. Supporting documentation for options trading strategies is available upon request.

Notice to French Investors: This publication is issued in France by or through Société Générale ("SG") which is authorised and supervised by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the Autorité des Marchés Financiers (AMF).
Notice to U.K. Investors: Société Générale is a French credit institution (bank) authorised by the Autorité de Contrôle Prudentiel (the French Prudential Control Authority) and the Prudential Regulation Authority and subject to limited regulation by the Financial Conduct Authority and Prudential Regulation Authority. Details about the extent of our authorisation and regulation by the Prudential Regulation Authority, and regulation by the Financial Conduct Authority are available from us on request.
Notice to Swiss Investors: This document is provided in Switzerland by or through Société Générale Paris, Zürich Branch, and is provided only to qualified investors as defined in article 10 of the Swiss Collective Investment Scheme Act ("CISA") and related provisions of the Collective Investment Scheme Ordinance and in strict compliance with applicable Swiss law and regulations. The products mentioned in this document may not be suitable for all types of investors. This document is based on the Directives on the Independence of Financial Research issued by the Swiss Bankers Association (SBA) in January 2008.
Notice to Polish Investors: this document has been issued in Poland by Societe Generale S.A. Oddzial w Polsce ("the Branch") with its registered office in Warsaw (Poland) at 111 Marszałkowska St. The Branch is supervised by the Polish Financial Supervision Authority and the French "Autorité de Contrôle Prudentiel". This report is addressed to financial institutions only, as defined in the Act on trading in financial instruments. The Branch certifies that this document has been elaborated with due dilligence and care.
Notice to U.S. Investors: For purposes of SEC Rule 15a-6, SG Americas Securities LLC ("SGAS") takes responsibility for this research report. This report is intended for institutional investors only. Any U.S. person wishing to discuss this report or effect transactions in any security discussed herein should do so with or through SGAS, a U.S. registered broker-dealer, futures commission merchant (FCM) and swap dealer. SGAS is a member of FINRA, NYSE, NFA and SIPC and its registered address is at 245 Park Avenue, New York, NY, 10167. (212)-278-6000.
Notice to Canadian Investors: This document is for information purposes only and is intended for use by Permitted Clients, as defined under National Instrument 31-103, Accredited Investors, as defined under National Instrument 45-106, Accredited Counterparties as defined under the Derivatives Act (Québec) and "Qualified Parties" as defined under the ASC, BCSC, SFSC and NBSC Orders

Notice to Singapore Investors: This document is provided in Singapore by or through Société Générale ("SG"), Singapore Branch and is provided only to accredited investors, expert investors and institutional investors, as defined in Section 4A of the Securities and Futures Act, Cap. 289. Recipients of this document are to contact Société Générale, Singapore Branch in respect of any matters arising from, or in connection with, the document. If you are an accredited investor or expert investor, please be informed that in SG's dealings with you, SG is relying on the following exemptions to the Financial Advisers Act, Cap. 110 ("FAA"): (1) the exemption in Regulation 33 of the Financial Advisers Regulations ("FAR"), which exempts SG from complying with Section 25 of the FAA on disclosure of product information to clients; (2) the exemption set out in Regulation 34 of the FAR, which exempts SG from complying with Section 27 of the FAA on recommendations; and (3) the exemption set out in Regulation 35 of the FAR, which exempts SG from complying with Section 36 of the FAA on disclosure of certain interests in securities.
Notice to Hong Kong Investors: This report is distributed in Hong Kong by Société Générale, Hong Kong Branch which is licensed by the Securities and Futures Commission of Hong Kong under the Securities and Futures Ordinance (Chapter 571 of the Laws of Hong Kong) ("SFO"). This document does not constitute a solicitation or an offer of securities or an invitation to the public within the meaning of the SFO. This report is to be circulated only to "professional investors" as defined in the SFO.
Notice to Japanese Investors: This publication is distributed in Japan by Societe Generale Securities (North Pacific) Ltd., Tokyo Branch, which is regulated by the Financial Services Agency of Japan. This document is intended only for the Specified Investors, as defined by the Financial Instruments and Exchange Law in Japan and only for those people to whom it is sent directly by Societe Generale Securities (North Pacific) Ltd., Tokyo Branch, and under no circumstances should it be forwarded to any third party. The products mentioned in this report may not be eligible for sale in Japan and they may not be suitable for all types of investors.
Notice to Korean Investors: This report is distributed in Korea by SG Securities Korea Co., Ltd which is regulated by the Financial Supervisory Service and the Financial Services Commission.
Notice to Australian Investors: Societe Generale is exempt from the requirement to hold an Australian financial services licence (AFSL) under the Corporations Act 2001 (Cth) in respect of financial services, in reliance on ASIC Class Order 03/8240, a copy of which may be obtained at the web site of the Australian Securities and Investments Commission, http://www.asic.gov.au. The class order exempts financial services providers with a limited connection to Australia from the requirement to hold an AFSL where they provide financial services only to wholesale clients in Australia on certain conditions. Financial services provided by Societe Generale may be regulated under foreign laws and regulatory requirements, which are different from the laws applying in Australia.

http://www.sgcib.com. Copyright: The Société Générale Group 2015. All rights reserved.
This publication may not be reproduced or redistributed in whole in part without the prior consent of SG or its affiliates.