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Chapter 1 : Forex Trading Magazine | Options trading | Volatility smiles black swans

A volatility smile is a common graph shape that results from plotting the strike price and implied volatility of a group of options with the same expiration date. The volatility smile is so named.

Chapter 19 Volatility Smiles 1 Which of the following is true of a volatility smile? A Implied volatility is on the horizontal axis and strike price is on the vertical axis B Historical volatility is on the horizontal axis and strike price is on the vertical axis C Implied volatility is on the vertical axis and strike price is on the horizontal axis D Historical volatility is on the vertical axis and strike price is on the horizontal axis 2 Which of the following is true? A Volatility smile for European puts is the same as for European calls B Volatility smile for European puts is the same as for American puts C Volatility smile for European calls is the same as for American calls D Volatility smile for American puts is the same as for American calls 3 Which of the following is true when the tails of a future foreign currency distribution are compared with those of a lognormal distribution with the same mean and standard deviation? A The left tail and right tail are thinner B The left tail is thinner and the right tail is fatter C The right tail is thinner and the left tail is fatter D Both tails are fatter 4 Which of the following is true when the tails of a future stock price distribution are compared with those of a lognormal distribution with the same mean and standard deviation? A The left tail and right tail are thinner B The left tail is thinner and the right tail is fatter C The right tail is thinner and the left tail is fatter D Both tails are fatter 5 Which of the following could cause the volatility smile typically seen for foreign currency options? A Currencies are traded in different countries at different times of the day B Currencies tend to have low volatilities C The activities of central banks causes occasional jumps in the exchange rate D Interest rates may be different in the two countries 6 Which of the following is true? A The volatility skew for equities is much more pronounced now than it was in B The volatility skew for equities has a positive gradient C The volatility skew for equities is consistent with the Black-Scholes-Merton model D The volatility skew for equities is similar to that for foreign currencies 7 Why do traders use volatility smiles for pricing options? A To allow for non-lognormality of the probability distribution of future asset price B Because it is consistent with recent market moves C As a tool to reflect their views about extreme market moves D Because extreme market moves are always more likely than Black-Scholes-Merton assumes 8 What does the shape of the volatility smile reveal about put options on equity? A Options close-to-the-money have the lowest implied volatility B Options deep-in-the-money have a relatively high implied volatility C Options deep-out-of-the-money have a relatively high implied volatility D All of the above 9 What does the shape of the volatility smile reveal about call options on a currency? A Options close-to-the-money have the lowest implied volatility B Options deep-in-the-money have a relatively high implied volatility C Options deep-out-of-the-money have a relatively high implied volatility D All of the above 10 Which of the following is NOT true? A A volatility surface provides more information than a single volatility smile B A volatility surface is used to determine the implied volatility of an option that does not trade actively C A volatility surface can be determined from a single volatility smile using interpolation D A volatility surface incorporates information about options with different maturity dates 11 A volatility surface is a table showing the relationship between which of the following? A High volatilities for in-the-money calls B High volatilities for in-the-money puts C High volatilities for at-the-money calls D Low volatilities for at-the-money puts 14 Which of the following is true for European call and put options? A If they have the same strike price, they have the same implied volatility B If they have the same time to maturity, they have the same implied volatility C If they have the same strike price and time to maturity, they have the same implied volatility D None of the above 15 Which of the following is true about daily exchange rate moves? A Four standard deviation daily moves in an exchange rate happen less frequently than they would do if changes were normally distributed B Four standard deviation daily movements in an exchange rate happen more frequently than three standard deviation moves in the exchange rate C The frequency of six standard deviation daily movements in an exchange rate is about once every years D None of the above 16 The daily percentage change in an exchange rate is compared to a normal distribution with the same mean and standard deviation. Which of the

following is true? A Both small and large exchange rate moves are more likely than with the normal distribution B Small exchange rate moves are less likely and large exchange rate moves are more likely than with the normal distribution C Large exchange rate moves are less likely and small exchange rate moves are more likely than with the normal distribution D Both small and large exchange rate moves are less likely than with the normal distribution 17 Which of the following is true as time to maturity increases? A The volatility smile for currency options tends to become more pronounced B The volatility smile for currency options tends to become less pronounced C The volatility smile for currency options first becomes less pronounced and then becomes more pronounced D The volatility smile for currency options remains approximately the same 18 If the volatility implied from an at-the-money put currency option were used to price other put options on the currency, which of the following would be true? A Out-of-the money and in-the-money prices would be too high B Out-of-the money and in-the-money prices would be too low C Out-of-the-money option prices would be too high and in-the-money option prices would be too low D Out-of-the-money option prices would be too low and in-the-money option prices would be too high 19 If the volatility implied from an at-the-money put stock option were used to price other put options on the stock, which of the following would be true? A Out-of-the money and in-the-money prices would be too high B Out-of-the money and in-the-money prices would be too low C Out-of-the-money option prices would be too high and in-the-money option prices would be too low D Out-of-the-money option prices would be too low and in-the-money option prices would be too high 20 The implied volatilities for strike prices of 1. The implied volatilities for strike prices of 1. Using linear interpolation, what is the implied volatility for a strike price of 1.

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Chapter 2 : Modelling Implied Volatility Smiles with Mixture Models â€“ Deep Fund Research

Volatility smiles are implied volatility patterns that arise in pricing financial www.nxgvision.com corresponds to finding one single parameter (implied volatility) that is needed to be modified for the Black-Scholes formula to fit market prices.

The volatility smile is one of the two curves that chart implied volatility. We can also say that the leaning of this curve to one side of the other is a reflection of whether the asset will end up making a bearish move or a bullish move. Volatility smiles form when strike prices of options which are out of the money have an implied volatility that is either higher or lower then ATM at the money options. When this type of curve structure occurs, a trader can take advantage of this situation in a number of ways. A typical volatility smile shows a plot of the options contracts on the x-axis against the implied volatility on the y-axis. If the smile is oriented to the left such that that the ITM side of the options contracts is located at a higher level of implied volatility, then this is a bearish sign. If the smile is oriented to the right such that the OTM contracts are located at a higher level of implied volatility, then this is a bullish sign. Volatility smiles are hardly in a perfect straight orientation. Rather, they tend to tilt in the direction of the highest implied volatility. Usually, the ends of the curve that forms the smile shows that when the implied volatility in an asset increases, so does the chance of extreme price movements to the upside or downside happening, with speculators rushing into OTM Options and longer term investors putting their money in ITM Options. Volatility smiles are essentially used to evaluate what the mood in the market is at any point in time. The volatility smile can tell traders whether the mood in the market is bearish or bullish, leading to the placement of trades on the put or call side of the market respectively. Trade Examples Let us look at these volatility smile charts and see what they imply for the binary options trader who is looking at the smiles as a guide to where the binary options bet should go. This is a typical volatility smile pattern that is seen when the mood in the market for the asset is bullish. In other words, there is greater volatility towards ITM call contracts. Look at the pattern closely. We can see that the smile is tilted to the right where spot prices are increasing. This will lead the binary options trader to consider taking a CALL option trade. In this example , we see a volatility chart which closely resembles a perfect smile, with the tilt of the smile almost in a straight, proportional fashion. Here, the bias for the trade started on a bearish note with a tilt towards the ITM puts, but we also see the smile getting broader to see a rise in implied volatility as spot prices increase, such that the smile almost starts and ends at the same horizontal point. This is the scenario that occurs in a sideways market, with prices rising and ebbing within a particular range. This will interest traders who are interested in the boundary options, where there is an option to choose IN, with price staying within a range. In this example, there is a bias towards the bearish end of the market, but this bias is not strong as there is a little bit of a tilt towards the bullish end of the market as well. So even though we see more implied volatility when the spot prices are low, we see the implied volatility not entirely flat when spot prices are rising. This will represent a tricky situation to the trader: Our last example shows a volatility smile that occurs when the asset is decidedly bearish. We can see that the implied volatility is highest when we have a reduction in spot prices; the bias of the smile is shifted to the left. Conclusion The problem with volatility smiles is that on their own, they cannot be used as the only tool of analysis of market mood. The trader has to use other indicators to back up the information provided by the volatility smile before deciding on a trade. In addition, volatility smiles charts are not readily available, and can only be obtained through the use of special software, which will obtain price data in order to plot the smile. Traders can use different strategies to make profit from the volatility smile setup. The key to successfully deploying this in the binary options market is to be able to detect when the volatility smile is either cheap or at a premium relative to the at-the-money implied volatility. Different tools should be used by the trader to gauge the direction of the volatility smile, in order to enhance the potential for profiting from them in the binary options market.

Chapter 3 : What is a volatility smile? | Investopedia

A volatility smile is a geographical pattern of implied volatility for a series of options that has the same expiration date. When plotted against strike prices, these implied volatilities can.

Using the Black Scholes option pricing model, we can compute the volatility of the underlying by plugging in the market prices for the options. Theoretically, for options with the same expiration date, we expect the implied volatility to be the same regardless of which strike price we use. However, in reality, the IV we get is different across the various strikes. This disparity is known as the volatility skew. Volatility Smile If you plot the implied volatilities IV against the strike prices, you might get the following U-shaped curve resembling a smile. Hence, this particular volatility skew pattern is better known as the volatility smile. The volatility smile skew pattern is commonly seen in near-term equity options and options in the forex market. Volatility smiles tell us that demand is greater for options that are in-the-money or out-of-the-money. Reverse Skew Volatility Smirk A more common skew pattern is the reverse skew or volatility smirk. The reverse skew pattern typically appears for longer term equity options and index options. In the reverse skew pattern, the IV for options at the lower strikes are higher than the IV at higher strikes. The reverse skew pattern suggests that in-the-money calls and out-of-the-money puts are more expensive compared to out-of-the-money calls and in-the-money puts. The popular explanation for the manifestation of the reverse volatility skew is that investors are generally worried about market crashes and buy puts for protection. One piece of evidence supporting this argument is the fact that the reverse skew did not show up for equity options until after the Crash of Another possible explanation is that in-the-money calls have become popular alternatives to outright stock purchases as they offer leverage and hence increased ROI. This leads to greater demands for in-the-money calls and therefore increased IV at the lower strikes. Forward Skew The other variant of the volatility smirk is the forward skew. In the forward skew pattern, the IV for options at the lower strikes are lower than the IV at higher strikes. This suggests that out-of-the-money calls and in-the-money puts are in greater demand compared to in-the-money calls and out-of-the-money puts. The forward skew pattern is common for options in the commodities market. When supply is tight, businesses would rather pay more to secure supply than to risk supply disruption. For example, if weather reports indicates a heightened possibility of an impending frost, fear of supply disruption will cause businesses to drive up demand for out-of-the-money calls for the affected crops. Many a times, stock price gap up or down following the quarterly earnings report but often, the direction of the movement can be unpredictable. For instance, a sell off can occur even though the earnings report is good if investors had expected great results

Chapter 4 : Volatility Smiles & Strategy Selection

The volatility smile skew pattern is commonly seen in near-term equity options and options in the forex market. Volatility smiles tell us that demand is greater for options that are in-the-money or out-of-the-money.

The volatility is a measure of the price fluctuation around an average trend movement. In this article we will look at the effect of varying volatility and extreme events on the pricing of options. In our article about pricing we recall that the standard option pricing tool is the Black Scholes model. However, the model does not make a correct assumption about the market as it uses a constant volatility across time. As the recent credit crisis has shown this appears far from true. The market switched between regimes of quiet action before the credit crisis to high volatility seen in the credit crisis or even extreme moves in the case of currency pegs being broken or sovereign default. These scenarios need to be priced into the options across strike and maturity. The market uses the Black Scholes model for pricing but does this by varying the volatility parameter for different options. The at-the-money strike, placed around the current spot level, will usually trade with the lowest volatility parameter. This reflects the fact that if the spot price stays in the vicinity of the at-the-money strike the volatility is low. Furthermore, if the volatility should increase the spot most likely will have moved, resulting in the option having become far out-of-the-money and thus worthless or moved far in-the-money resulting in the option price being equal to a spot position with inception at the strike. That is, the volatility risk will have disappeared. The further we move away from the at-the-money point the higher the probability that we have moved into a higher volatility regime and therefore the volatility is quoted higher. Looking at the volatility as a function of the strike price, we get a curve resembling a smile, see Figure 1, and as consequence we refer to this as the volatility smile of a specific currency pair and tenor. The smile is, of course, different for different currency pairs and tenors. Some smiles are evenly distributed on both the put and the call side while others are skewed to one side. A skew indicates that the market sees an increased likelihood of a stampede on that side of the at-the-money strike. This could, for an example, be in a currency pair used for carry trading. A rise in the funding currency might force liquidation and a subsequent strong move with high volatility. The strikes used will usually be based on the delta the sensitivity of the option price to a move in the spot price. The most traded delta is the 25 delta. The strangle, see Figure 2, deals with two long positions on each wing and thus represent the average price at these wing points above the at-the-money level in volatility terms. The option market referrers to each side of the at-the-money as wings. The put wing is where the puts are out-of-the-money. That is, the strikes are below at-the-money. The call wing is the opposite side. The strangle quote can be seen as an expression of the steepness of the smile, see Figure 1. The risk reversal, see Figure 3, is the ombination of being long a call and short a put and thus represents the difference in price between the two wings. The risk reversal quote can be seen as an expression of the skewness of the smile, see Figure 1. The strangle deals in particular with the volatility and is non-directional. Therefore, it is best used as a gamma scalping strategy, as described in the previous article. That is going long the strangle and delta hedging in anticipation of a higher volatility regime and getting a higher leverage than simply trading the at-the-money. Or one can short the wings if the market is overpricing the regime change risk. The risk reversal on the other hand always becomes a directional trade, giving the trader a long gamma position on the one side and a short one on the other side. For example at the writing of this article there is a skew that favours a weaker EUR stronger USD and therefore, one might consider going long the risk reversal. The deal will obviously make money if the EUR starts to rally. However, the deal could also be made profitable by the spot price going nowhere, in which case the put leg would most likely start to fall in price, or the spot might fall at a slower rate than the volatility suggested by the put leg thus opening up for a gamma scalping strategy by delta hedging the further fall in the spot. The option strategy thus leaves more opportunities for a profitable trade than the simple spot position. The risk reversal, see Figure 3, is the combination of being long a call and short a put and thus represents the difference in price between the two wings. The price risk of changes in the volatility regime is captured by the quotes at the delta points. However, as the delta describes the possibility of the market moving to a certain strike in the Black Scholes world, these are not good at describing extreme

events. The point here is that such events would either require a huge volatility to fit in the Black Scholes world or they would simply have zero probability and thus no value. Therefore, these options on Black Swans will often be priced in pip terms, where each pip above zero can be interpreted as the market seeing a risk of the currency making an extreme move to that particular strike. Shorting these options will probably lead to nice little profit, most of the time. However should push come to shove and the option becomes in-the-money the outcome will most likely be catastrophic, as the notion of a normal functioning market with good liquidity is probably farfetched and thus hedging opportunities would be small. Options of this calibre should thus only be viewed as pure bets on extreme events.

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Chapter 5 : Volatility Smile

volatility smile. Replication will hold irrespective of jumps, volatility, etc. -- only problem is counterparty risk. Try to do approximately the same for other exotic options.

Butterfly , on the other hand, is a strategy consisting of: Implied volatility, in contrast, is determined by the market price of the derivative contract itself, and not the underlying. Therefore, different derivative contracts on the same underlying have different implied volatilities as a function of their own supply and demand dynamics. Term structure of volatility[edit] For options of different maturities, we also see characteristic differences in implied volatility. For instance, it is well-observed that realized volatility for stock prices rises significantly on the day that a company reports its earnings. Correspondingly, we see that implied volatility for options will rise during the period prior to the earnings announcement, and then fall again as soon as the stock price absorbs the new information. Options that mature earlier exhibit a larger swing in implied volatility sometimes called "vol of vol" than options with longer maturities. Other option markets show other behavior. For instance, options on commodity futures typically show increased implied volatility just prior to the announcement of harvest forecasts. Options on US Treasury Bill futures show increased implied volatility just prior to meetings of the Federal Reserve Board when changes in short-term interest rates are announced. The market incorporates many other types of events into the term structure of volatility. For instance, the impact of upcoming results of a drug trial can cause implied volatility swings for pharmaceutical stocks. The anticipated resolution date of patent litigation can impact technology stocks, etc. Volatility term structures list the relationship between implied volatilities and time to expiration. The term structures provide another method for traders to gauge cheap or expensive options. Implied volatility surface[edit] It is often useful to plot implied volatility as a function of both strike price and time to maturity. This defines the absolute implied volatility surface; changing coordinates so that the price is replaced by delta yields the relative implied volatility surface. The implied volatility surface simultaneously shows both volatility smile and term structure of volatility. Option traders use an implied volatility plot to quickly determine the shape of the implied volatility surface, and to identify any areas where the slope of the plot and therefore relative implied volatilities seems out of line. The graph shows an implied volatility surface for all the put options on a particular underlying stock price. The Z-axis represents implied volatility in percent, and X and Y axes represent the option delta, and the days to maturity. Note that to maintain put-call parity , a 20 delta put must have the same implied volatility as an 80 delta call. For this surface, we can see that the underlying symbol has both volatility skew a tilt along the delta axis , as well as a volatility term structure indicating an anticipated event in the near future. Sticky[edit] An implied volatility surface is static: How the surface changes as the spot changes is called the evolution of the implied volatility surface.

Chapter 6 : Volatility smile - Wikipedia

Volatility Smile - Origin & Implications Click To Tweet. Now, on comparing the values of percentages, it is observed that in the real world, there is a much higher percentage of the number of days when the returns values deviate more than 4, 5 and 6 standard deviations compared to the lognormal model.

Chapter 7 : Volatility Smiles in Binary Options - Binary Options Strategy

Plot implied volatility against delta of the option Note: traders sometimes define at-the money as a call with a delta of or a put with a delta of âˆ’

Chapter 8 : Confusion with volatility smiles implied by different models - Quantitative Finance Stack Exchan

in consequence, the volatility smile for single stocks often looks like Figure 3, more symmetric and smile-like. In FX

markets, the smile can be even more symmetrical, resembling a real grin, especially if the.

Chapter 9 : Modelling Volatility Smile In Python

The volatility smile is an artificial construction that arises from the inaccuracy of the Black-Scholes formula in predicting options prices. For reference, the strike price for an option is the price at which we can trade the underlying asset.