DOWNLOAD PDF MARKET MAKER VOLATILITY MODEL FILE

Chapter 1 : Market maker - Wikipedia

The idea of the strategies is the combination of a VOLATILITY/VOLATILITY SURFACE PREDICTION with an ARBITRAGE OF MARKET MAKER MISPRICING. One can use arbitrarily sophisticated methods for volatility and volatility surface prediction.

This field is for validation purposes and should be left unchanged. How do they earn profits? Market Makers profit by charging higher offer prices than bid prices. The spread compensates the market makers for the risk inherited in such trades. The risk is the price movement against the market makers trading position. Market Makers are always counterparties to trades done by informed traders and in case of any volatility in the market; the Market Makers are often stuck with wrong positions. Another fatal risk for a Market Maker is to not have the latest information. How automated trading enables market making? To be efficient, market makers should be able to adjust their quotes immediately in response to market events. Therefore they can handle their risks better. Since automated systems can handle their risks better, therefore they offer better quotes for others. Faster response time Pricing of derivatives that enable investors to hedge often involve time consuming mathematical calculations. While humans can take minutes, automated systems are can do these calculations in microseconds. The response time is therefore much faster. Scalability Human traders can only track activities in a few instruments, while automated systems can do thousands simultaneously. The same trader using an automated trading system provides liquidity in significantly more financial instruments simultaneously. Automated market making systems are always active. What is the impact of algorithmic market makers on markets? Price Volatility Difference between prices of consecutive trades done against a human market maker will be much higher than those done against an automated market maker, asset price volatility therefore reduces. Impact Cost With automation rendering market making easy, order books have become thick. Some of the important types of HFT strategies are explained below. Order flow prediction HFT strategies HFT order flow prediction strategies try to predict the orders of large players in advance by various means then take trading positions ahead of them and then lock in the profits as a result of subsequent price impact from trades of these large players. Execution HFT Strategies Execution HFT strategies seek to execute the large orders of various institutional players without causing a significant price impact. Liquidity Provisioning â€" Market Making strategies HFT market-makers are required to first establish a quote and keep updating it continuously in response to other order submissions or cancellations. This continuous updating of the quote can be based on the type of the model followed by the HFT market-maker. Inventory based model or Information based model. In the process, the HFT market-makers tend to submit and cancel a large number of orders for each transaction. Automated HFT Arbitrage strategies HFT arbitrage strategies try to capture small profits when a price differential results between two similar instruments. Index arbitrage can be considered as an example of the same. If the price movement differs then the index arbitragers would immediately come into the picture and try to capture profits through arbitrage using their automated HFT strategies. To do effectively, the HFT arbitrage strategies require rapid execution to profit quickly from the mispricing before other participants jump in.

Chapter 2 : The Stochastic Dominance Violation of Index Call Options in the Presence of Market Makers

price volatility and the portfolio holds either large gross market values or large net directional market values. 35 In such cases, the model may not collect sufficient margin, which could hinder NSCC's ability to effectively liquidate or hedge the Member's.

Most debates have focused on expensive out-of-the-money put options. Hence, expensive index call options are also an unsolved puzzle in the finance literature. On the other hand, recent finance papers find that market makers play an important role in the pricing of index options. In this paper, I explore how constrained market makers interact with heterogeneity in beliefs and index option prices. The incremental findings from my model can be summarized as follows. First, even with the presence of market makers, the stochastic dominance upper bound violation of index call options occurs when heterogeneity in beliefs is sufficiently large. This result is novel, insomuch as someone may argue that if heterogeneous end-users share the risk themselves, heterogeneity in the presence of constrained market makers may not lead to option mispricing. Second, as the market maker is more constrained, the stochastic dominance upper bound violation becomes more severe. This paper is related to and contributes to the growing literature on the puzzle of index options. In addition, this paper complements the literature on the role of market makers in index option markets and the stochastic dominance literature. Introduction Finance researchers have been debating over whether index options are overpriced [1] [2] [3] [4]. Most debates have focused on expensive out-of-the-money hereafter, OTM put options [5] [6]. However, the stochastic dominance hereafter, SD literature has documented that index call options are also too expensive. SD upper bounds are the preference-free reservation write prices of call and put options, which are the minimum option price at which any rational agent is willing to write an option to increase her expected utility [9] [10] [11] [12]. SD upper bounds are often deemed the maximum possible option price in the absence of mispricing between an underlying security and the corresponding option. The conventional explanation for expensive options, in which the demand is driven by OTM put options for insurance purposes against steep market declines e. For simplicity, he abstracts out the presence of market makers. However, recent finance papers [16] [17] , among many others find that market makers play an important role in the pricing of index options. In this paper, I explore how constrained market makers interact with heterogeneity in beliefs and index options prices. The optimal holding of options increases as heterogeneity in beliefs increases [18]. In the presence of heterogeneity in beliefs and portfolio constraints, option mispricing is required for the market to clear [19]. Because of limits-of-arbitrage e. The end-user demand for index options is positive, and market makers provide liquidity [16] [23]. As the net end-user demand increases, the option price increases because market makers with limited risk-sharing capability demand higher option premia at equilibrium [16]. I keep my stylized heterogeneous-agent model as simple as possible; my model has the bare minimum ingredients to endogenize the aforementioned prior findings in the finance literature. First, even with the presence of market makers, the SD upper bound violation of index call options occurs when heterogeneity in beliefs is sufficiently large. Second, as the market maker is more constrained, the SD upper bound violation becomes more severe. In addition, this paper complements the literature on the role of market makers in index option markets e. The remainder of this paper is structured as follows. Section 2 briefly discusses related literature. Section 3 proposes my model. Section 4 reports the numerical results and summarizes my findings. Using Broadie et al. The literature has proposed several explanations to the question: If options are too expensive, why is this? The explanations range from state-dependent dead-weight costs to non-hedgeable risk, volatility and jump risk premia, end-user demand, liquidity risk, the Peso problem, biased beliefs, and so forth see, e. However, heterogeneity has received insufficient attention, and research in heterogeneity vs. The current paper fills this gap in the literature. The Model In this section, I propose a heterogeneous-agent model adapted from [15] where rational agents equipped with heterogeneous beliefs trade a stock and its option. My stylized economy has two risk-averse end-users of index call options. These two end-users are heterogeneous in their beliefs in the expected output. One end-user expects high output, and the other expects low output. Because of the well-known leverage

effect, the bearish end-user expects high uncertainty, while the bullish end-user expects low uncertainty. They trade a claim on an output i. A simple one-period economy has a single consumption good and one underlying risky asset. In this stylized economy, the bullish end-user agent A , hereafter and the bearish end-user agent B , hereafter are endowed with 1 stock each, and they trade their shares of the underlying asset and the call option at the beginning of the period. The call option with the strike K.

Chapter 3 : Market Makers' Supply and Pricing of Financial Market Liquidity

price volatility and the portfolio holds either large gross market values or large net directional market values. 34 In such cases, the model may not collect sufficient margin, which could hinder NSCC's ability to effectively liquidate or hedge the Member's.

See Uncovered call writing and Uncovered put writing. Narrow-Based Generally referring to an index, it indicates that the index is composed of only a few stocks, generally in a specific industry group. Neutral Describing an opinion that is neither bearish nor bullish. Neutral option strategies are generally designed to perform best if there is little or no net change in the price of the underlying stock or index. See also Bearish and Bullish. Non-Equity Option An option whose underlying entity is not common stock; typically refers to options on physical commodities and index options. Notice Period The time during which the buyer of a futures contract can be called upon to accept delivery. Typically, the 3 to 6 weeks preceding the expiration of the contract. Opening Transaction A trade which adds to the net position of an investor. An opening buy transaction adds more long securities to the account. An opening sell transaction adds more short securities. See also Closing Transaction. Open Interest The number of outstanding option contracts in the exchange marketor in a particular class or series. Option Pricing Curve A graphical representation of the projected price of an option at a fixed point in time. It reflects the amount of time value premium in the option for various stock prices, as well. The curve is generated by using a mathematical model. The delta or hedge ratio is the slope of a tangent line to the curve at a fixed stock price. See also Delta , Hedge Ratio , and Model. Options Clearing Corporation OCC The issuer of all listed option contracts that are trading on the national option exchanges. Order Book Official The exchange employee in charge of keeping a book of public limit orders on exchanges utilizing the "maker-maker" system, as opposed to the "specialist system", of executing orders. See also Market-Maker and Specialist. Out-of-the-money A call option is out-of-the-money if the strike price is greaterthan the market price of the underlying security. A put optionis out-of-the-money if the strike price is less than the marketprice of the underlying security. The OTC option has a direct link between buyer and seller, has no secondary market, and has no standardization of striking prices and expiration dates. Overvalued Describing a security trading at a higher price than it logically should. Normally associated with the results of option price predictions by mathematical models. If an option is trading in the market for a higher price than the model indicates, the option is said to be overvalued. See also Fair Value and Undervalued. Also used as a point of reference - an option is sometimes said to be trading at a half-point over parity or at a quarter-point under parity. An option trading under parity is a discount option. See also Discount and Intrinsic Value. Physical Option An option whose underlying security is a physical commodity that is not stock or futures. The physical commodity itself a currency, treasury debt issue, commodity - underlies that option contract. See also equity option , index option. Position As a noun, specific securities in an account or strategy. As a verb, to facilitate; to buy or sell - generally a block of securities - thereby establishing a position. See also Facilitation and Strategy. Position Limit The maximum number of put or call contracts on the same side of the market that can be held in any one account or group of related accounts. Short puts and long calls are on the same side of the market. Short calls and long puts are on the same side of the market. Premium The price of an option contract, determined in the competitivemarketplace, which the buyer of the option pays to the option writer for the rights conveyed by the option contract. Price-Weighted Index A stock index which is computed by adding the prices of each stock in the index, and then dividing by the divisor. See also Capitalization-weighted index , Divisor. Payoff Diagram See Profit Graph. Profit Graph A graphical representation of the potential outcomes of a strategy. Dollars of profit or loss are graphed on the vertical axis, and various stock prices are graphed on the horizontal axis. Results may be depicted at any point in time, although the graph usually depicts the results at expiration of the options involved in the strategy. Profit Range The range within which a particular position makes a profit. Generally used in reference to strategies that have two break-even points - an upside break-even and a downside break-even. The price range between the two break-even points would be the profit range. See also Break-Even Point. Profit Table A table of results of a particular strategy at some point in

time. This is usually a tabular compilation of the data drawn on a profit graph. See also Profit Graph. Protected Strategy A position that has limited risk. A protected short sale short stock, long call has limited risk, as does a protected straddle write short straddle, long out-of-the-money combination. See also Combination and Straddle. Public Book of orders The orders to buy or sell, entered by the public, that are generally away from the current market. The order book official or specialist keeps the public book. Market-Makers on the Cboe can see the highest bid and lowest offer at any time. Put An option contract that gives the holder the right to sell the underlying security at a specified price for a certain fixed period of time. Ratio Calendar Spread Selling more near-term options than longer-term ones purchased, all with the same strike; either puts or calls. Ratio Spread Constructed with either puts or calls, the strategy consists of buying a certain amount of options and then selling a larger quantity of more out-of-the-money options. Ratio Strategy A strategy in which one has an unequal number of long securities and short securities. Normally, it implies a preponderance of short options over either long options or long stock. Ratio Write Selling of call options in a ratio higher than 1 to 1 against the stock that is owned. Resistance A term in technical analysis indicating a price area higher than the current stock price where an abundance of supply exists for the stock and therefore the stock may have trouble rising through the price. Return on investment The percentage profit that one makes, or might make, on his investment. Return if Exercised The return that a covered call writer would make if the underlying stock were called away. Reversal Arbitrage A riskless arbitrage that involves selling the stock short, writing a put, and buying a call. The options have the same terms. See also Conversion Arbitrage. See also Theoretical Value. Risk Arbitrage A form of arbitrage that has some risk associated with it. Commonly refers to potential takeover situations where the arbitrageur buys the stock of the company about to be taken over and sells the stock of the company that is effecting the takeover. Roll Down Close out options at one strike and simultaneously open other options at a lower strike. Roll Forward Out Close-out options at a near-term expiration date and open options at a longer-term expiration date. Rolling A follow-up action in which the strategist closes options currently in the position and opens other options with different terms, on the same underlying stock. Roll Up Close out options at a lower strike and open options at a higher strike.

Chapter 4 : Market Makers in Equity Options Are Vanishing - Barron's

These pros use the VIX Index options for gross market-balance hedging. Very little else provides such acute price sensitivity to S&P Index prospects.

Research papers on the topic goes back to but a concrete closed form model that actually outperforms affine type models with jumps in price and volatility was new. We are now looking into the issue of whether these models are able to consistently and universally make profits from mispricings of the market makers in liquid options. This is not a hard problem if one wants to produce a trading strategy for a single option by hammering together something reasonable. To this end, I have produced a system that can produce tradeable strategies with a few tunable parameters. One can use arbitrarily sophisticated methods for volatility and volatility surface prediction. This part is not particularly optimal but it is not the central problem. Here we have results that are far more nontrivial: The best surface fits produces a minimal error of this type which we then use to decide the mispricing level. This mispricing level seems to be central to actually systematically profiting from the option markets despite a big bid-ask spread! Let me repeat this a few times so this is clear. Ok these graphs may not look pretty but they have no stoplosses or other artificial smoothing. This is actually what produces the reasonable results above in backtests. This is also crucial: Finally, here is a harder example: EEM where the results are not as clean but you can see that this problem of producing universal results is a tractable problem at least for In fact you can play around with fixed constant thresholds which is what I did till I realized the above and find that the results are much less steady. On the problematic side, the universality I would like to see does not come without tuning the constants for each stock. The code attached shows you the details of what produces these results â€" the valuation code is in cmlf. I would like to propose to the world that: A hard nontrivial problem is the problem of optimal implementation of stochastic volatility models to somehow force arbitrage-freeness. But you can examine the takeArbitragePositions and other functions in the R code to verify that these are serious strategies.

Chapter 5 : Introduction to Market Making & High Frequency Trading Strategies

We constantly talk about the market makers [MMs] and their activities. It is apparent from their comments, that many readers have varied, limited views about the function of MMs, their status.