Quant

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1) <u>The market :</u>

1. **<u>function and organisation :</u>**

   *The main function of a financial market is to make so that an operator is in capacity being able to exchange titles, contracts or financial product, in passing orders to the market or to the book, in conditions which are said "normal".

   Thus * the market is going to allow, an average operator, being able to buy or sell a title or a contract (for example some oil), in the quantity which he wishes, and as he wishes it. Be able to buy and sell whenever, and any quantity, in a liquid environment where all the purchases and the sales are allowed and accepted. It is the first function of a financial market.

   * A lambda operator will want to buy or sell something through the market, so it will wait for the market he can buy it when it needs to sell, or he can sell it when it needs to buy. At the lambda operator may buy or sell a number of shares or contracts easily, at an estimated price "fair"; and + the contract in question will be considered competitive, because it will be called "liquid".

   * The organization of a market is coordinated via a set of general and institutional operators who will oversee the operation stated above. Indeed, for a lambda operator might buy or sell a quantity of contracts in a market, he must already have an access to this market is usually the broker (broker, for example GPA) that suits him give this access, and who will make the intermediary between requests transmitted from the client (eg tradeur) and the liquidity provider (eg GoldmanSach's), so that the operator is on he finds someone opposite him who agrees at the time to buy it or sell the same amount. Once past tradeur order of the broker, the broker will then forward the order to the exchange (eg CME Group), which itself will forward it to the liquidity provider for the order to be served (either bought or sold). The orders then bought and sold by the liquidity provider must be managed, that is managed under the supervision of the regulator (eg SEC).

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                          régulateurs
    FCA          SEC                AMF          CFTC        font passer les
                                                             lois pour
                                                             controler les
                                                             prix
                          exchanges
manipulent les prix  CME    ICE   EUREX   LMEX   NYSE
avec

                    apporteurs de liquidités
    GoldmanSach's   JP morgan   City Group   deutsch bank    couvrent leurs
                                                             risques avec
                     Brokers    /   Courtiers
    AMP  Transact  FuturesOnlines  SaxoBank  IB  FXCM
                                                             passe ses ordres chez
                     Client  / tradeur
    Pierre    Paul         Jacques
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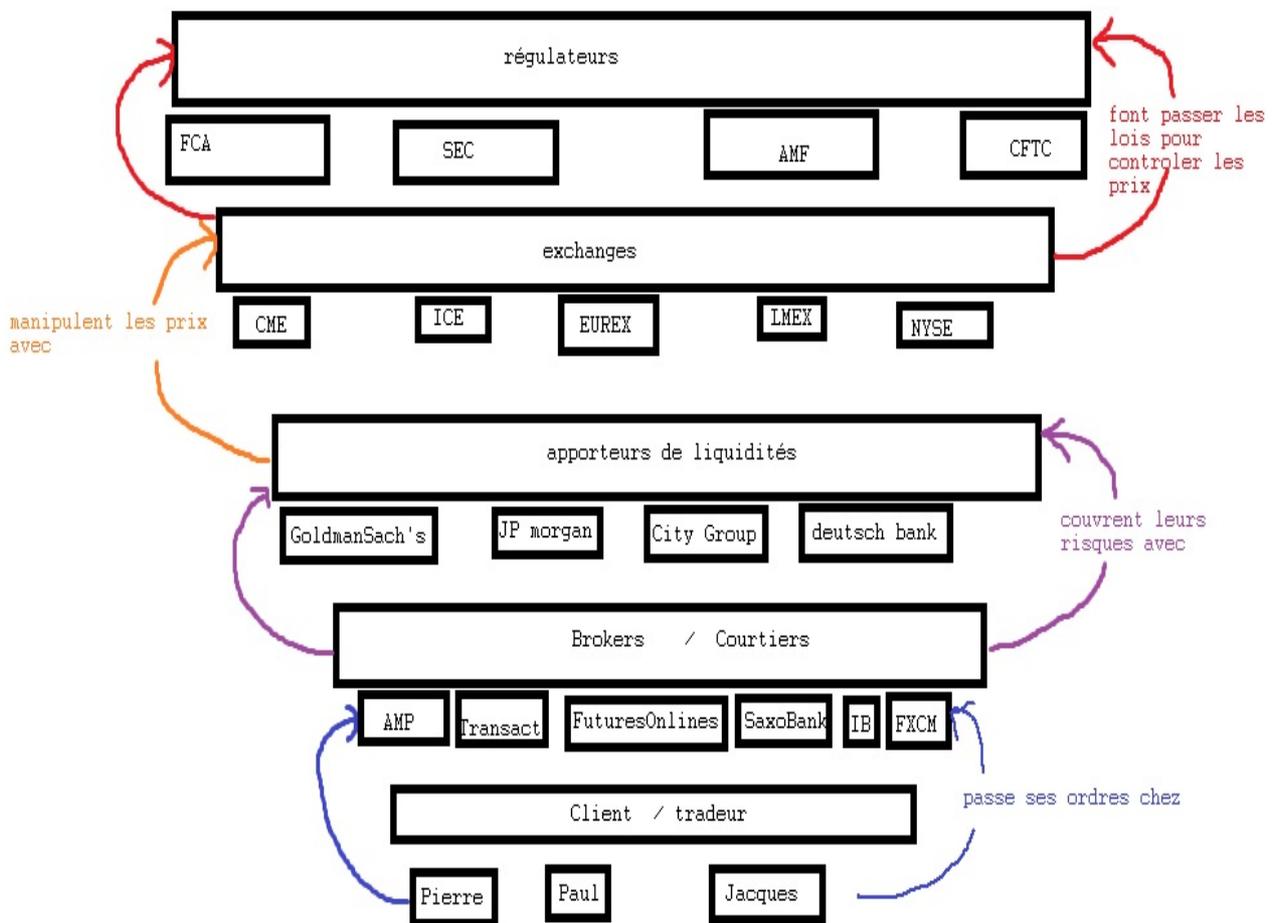
2. the basic principles:

* For a market to function, as constructed, and according to the rules that surround it today; there are certain basic principles that should be kept absoluemment in mind at all times to avoid being next to the plate regularly: it is a matter of financial survival.

-> The earnings of each other represent losses!

Indeed, nothing is created in the markets, everything is "transformed"; and what is gained by one is necessarily lost by others.
Take the example of a price above the day, and observe what happens on the above? There are buyers market volumes, and volume sellers markets.
 When one buys a lower, someone else sell him this low. Therefore, the gain of one when the price goes up, will be on the unrealized loss on the other.
As long as enough galore will be interested in buying the above, you can use these people to cash by selling this example above to those people who want to buy anyway. Your gain will be cashed because someone has been ready to buy you what you wanted to sell at the highest.
It is therefore useful idiots of services they need, and uninformed traders to flock and oblivious to the winners can collect their winnings.

-> The price trend is not necessarily your friend!

it is clear that when a trend is in place, you'll want to follow because this is you learn to do in school, on the internet and in books: buy an uptrend, and sell a bearish trend. As everyone does.
But a trend will last only until everyone sees it. This is the first problem. Once the trend is seen, it is usually too late, since the trend is already there and seen by all. Who says it will continue or not?

Is it wise to buy an uptrend or sell a bearish trend by making the same thing as the herd of losers operators, who also will continue to buy this uptrend and sell this bearish trend, despite the results negative profitability level?

Why do mimicry, while all these people you follow are losers at the end of races? Is it not absurd? Is this really the right logic?

Why not do the opposite of this mass of losers operators? To the extent that nothing is created, if you are in front of the flock who works at a loss, you logically more likely to get out gain, relatively "quiet".

-> The market is not always right, he usually wrong!

If the market operators were still in the "real", on its way to "fix" the price of financial markets; you think that the US investment banks would all be in bankruptcy, since it is they who give the party against the market. However, it is clear that these investment banks that provide liquidity in the markets (which are called market making) end their gain in days 340 days 365 days a year. Market making activities is their most profitable marketsThe extent of this fact; So why go to get in front of the fittest? What is the logic? Why fight against the strongest when you can go quietly in its meaning and enjoy its striking force to achieve a price?

* This cartoon illustrates perfectly the current point where it is today in modern finance. Indeed, when the broker calling his client to say he has a golden opportunity, and to make him purchase one share; it's usually all Institutional already in the process of the sale; and the buyer liquidity provided by small individuals who arrive at an end, will generally serve to investment banks out of existing long positions. One may think that the interests of both are sometimes the interests of others; but it is clear that the interest of one is often unfortunately not the other.

- You will also notice that the media loves to relate the highest, lowest, and historical records of the prices of financial assets. This is usually a marketing bait under the leadership of the investment banks, to motivate the small individuals to pay the highest. The cannon fodder for the market maker. Godsend. They invite their customers to buy, because they need to sell. And vice versa. Never trust your banker. It goes without saying.

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3. Different actors:

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- We can classify the different market players in three distinct categories.
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- -> The tradeurs retails
- -> Professionals tradeurs
- -> Institutional tradeurs

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- *** Among the tradeurs retails, one will find various types of profiles:**
-
- -> The useful tradeur:
-
- he thinks he is knowledgeable and he will make a profit, but is usually chronic loss. It is even unaware of his ignorance, sometimes dreamy. He usually works with the concepts of technical analysis and Chartism. It follows the trend and working breaks. It is in the mold in which the industry would like to see it evolve. He works at a loss.
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- -> Tradeur the news:
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- it will get in position before the news arrived; economic information is
- essential for him because that's what will make his decision. He will refer to
- economic calendar, and results of economic statistics. He will give
- importance to the fundamental news at large. He also works at a loss.
-
- -> The gambleur:
-
- it usually trade on fairly volatile instruments and it will do so with pleasure,
- by passion above all; it may even love the risk, and pass the second
- plan. It is generally believed good trader informed and aware of his ignorance on some things. Its results will remained fairly random.
-
- -> The tradeur informed:
-
- it has a generally very technical approach to the market and will use some market rules that are currently in place, experience, and some or recurrent phenomena regarding the functioning of markets. He knows he is usually unconscious and / or exceeded by certain aspects of the markets, but
- managed to deal with that. Its results are usually good.
  Some heavyweights of the brokerage industry, and several reports of the highest regulatory bodies, it appears that 90% of retails tradeurs lose 90% of their trading accounts within 90 days.
- It is therefore quite "natural" in a logic of capitalism and strict profit, that
- the industry runs the brokerage of these retails tradeurs stream of customers there, based on a
- business model where the client loses money, I would by definition.
-
- Moreover, this fact statement in the second paragraph, specific to the brokerage industry does not conflict of interest with the rest of the financial industry, and other key financial players (dealeurs, exchange, regulators)

  * Among the professionals tradeurs, one will find various types of profiles:
-
- -> The Hedgers:
-
- A hedger is tradeur market operator seeking to cover the risk of
- price movement of an underlying to which it is exposed. Therefore taking position on
- derivative contracts such as options, swaps, futures, warants, etc.

- His job is to cover risks through various assemblies and positions.
-
- -> The Arbitrage:
-
- Tradeur an arbitrageur is a market operator who will seek to exploit what he sees as the markets of inneficiences, nottamment in correlations and
- decorrelations of some underlying. So take a position on several
- simultannément instruments to work back to the standard and efficiency.
-
- -> The Value Traders:
-
- A tradeur value is an operator that will base its decision on an approach
- completely fundamental and economic. It will study the economic policy
- different companies, the prospects for growth, the labor market, and
- it will pick up assets that appear fundamentally valued or under him
- valued to work on these potential performance. These involved tradeurs
- 3 or 4 times a month for back positions when their perception of
- value changes.
-
- -> The Momentum Traders:
-
- An action tradeur the pure price and lasts to the old, usually of former tradeur
- floor that has failed to adapt to the advent of HFT trading and rendering, electronic.
- It follows the price movements, generally over long time units.
- He usually buys when the market goes up and sell when the market down.
- This is usually the loser by tradeur professional excellence.

- -> The Insiders:
- A tradeur which has key information that other professionals and
- Institutional do not necessarily have. It is not legal, but hardly detectable
- on the long term. Legal restrictions exist to limit this nottamment
- in the size and frequency of market orders; which give the final price less
- "Informative". It made some "big shots" from time to time thanks to the info + or -
- "Inside".
-
- -> The Dealeurs or liquidity provider:
- A tradeur that will make the market making at + or - high frequency without status
- regulated with the exchange. He buys those who want to sell in the market, and sell
- those who want to buy at the market with limit orders. It works in limit orders to notes. He will try to determine what informed tradeurs will do. It does not charge commission officially, but indirectly take on the spread that is offering the best limit orders selling price and the purchase price.
  * Among institutional tradeurs, we will find different types of profiles:
-
- -> The Brokers:
-
- These are companies that organize passage of the activity levels of traders customers
- on the stairs. They can manage the distribution of flows, platforms, service
- customer, technical support, customer training, etc. They can be related

- more or less directly with boxes of dealing manager who helps them against the parties. They are the customers of exchanges. They may find themselves in conflict of interest facing a tradeur informed winner and / or high leverage.
-
- -> The Aggregators:
-
- These are companies that generally make the flow aggregation and flow
- of market orders. Their function is to facilitate the exchange of large positions
- wholesale operators in order to avoid disproportionate impacts on prices during executions. They managent open positions they sell and redeem to manage their inventories.
-
- -> Blok facilitators:
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- These are companies that are there to execute trades or repurchase blok to brokers
- and market maker.
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- -> Central banks:
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- They are there to regulate cash flow, manage the value of the currency, manage the
- Policy interest rates in each currency area. They can intervene on
- any markets index, currencies, metals, bonds, stocks, etc.
- Their main roles is to support the economy by financing banks. they have
- as a lender of last resort role in.

4. The general rules:

While deregulation excessive raging in the world of finance, since a maintenat
decades; force is that a major part of the financial derivatives are still regulated precisely because standardized.

markets rules:

margin trading: you have the right to buy or sell an asset without holding him physically, and without having to pay completely. You will be asked a so-called margin of good faith, which corresponds to a percentage of your value for the contract, ranging from 1 to 20% depending on the type of derivatives. This margin trading is just possible by the existence of the debt leverage provided by the broker. This leverage can finance purchases and sales with non-existent money.

Short selling: you can and you have the right to sell what you do not have. Suffice it to buy it for the hold, and then you can sell it. This purchase and resale automatic operation to open a sell position on the market will be automated through sales market orders, limit orders or pending sale to the book.

The hedging: you can buy and sell simultannément same active in similar or different amounts on certain derivatives. As you can buy an asset at a deadline, and sell the same assets to another term.

the rules of brokerage:

the broker is "obliged" to provide purchase price and selling constantly and fairly for everyone.

The broker will pay the spread, by committees, and réttributions other operators in the management of flows.

The broker does not pay its margin calls and works with HFT algo

The broker entire market depth and the full open position of the market constantly.

The broker has the technological and legal capacity to adjust supply and demand orders expectations it provided in the book, in a timing that surpasses that of other operators.

The broker can decide ultimately the execution price of market orders.

The broker can not legally trader market order.

The broker can not trade with itself.

The broker has a close relationship with regulators and exchanges.

the rules of the exchanges:

they organize the technological structure for the exchange of orders: everything is order routing, execution of process, matching process orders, etc.

they are officially the "square" main market where all orders are expected to pass.

Their clients are brokers, hedge funds, investment banks.

They are under the "control" and officially regulated by the amf type of regulatory bodies, FCA, cftc.

They charge commissions to brokers for their technological services Execution of orders, management Clearinghouse, supply flows, etc.

They have converging interests with brokers: making Volume errands.

They work with HFT algo to make the connections between the flow of brokerset execution orders on the markets.

They can reject market orders, and do not execute the (canceled); they can also close the market temporarily and reopen it when they wish.

They provide brokers with status technological advantages to go faster than all other operators.

They offer reduced commissions, and best execution for those who rent the seats in the exchange.

They have powerful lobbies in the regulatory sector, the top civil service, banks and politics; used to pass laws and enforce them in their interests.

The rules of regulators:

they organize the legal framework of the functioning of trade.

They define the rules and standards of traded contracts. (Valeures, size, weight, quality standards and process, compensation, etc.)

They regulate brokers, the exchanges and banks, as well as management activities at large.

They control some HFT trading, officially for lack of means.

they even promote HFT trading in regulations by introducing more rules to their advantage.

Handling price is officially banned, but is tolerated when performed at high speed by HFT algo.

The washing trade, quote stuffing, layering and pat painting is prohibited: any technical manipulation is officially banned on paper.

A technological-legal power of price manipulation is however about to be legalized and institutionalized.

They will set up in partnership with the exchanges, rules of emergency event: the rules of emergencies in case of significant loss of control of a market price for a better re stabilize market:

Eg for CME: ban to have a variation of + 3% on a major currency in one session: beyond this threshold, CME reserves the right to reject all orders markets in the direction of movement.

Examples of Prohibited Activity

The following is a non-exhaustive list of various examples of conduct that may be found to violate Rule 575.

- A market participant enters one or more orders to generate selling or buying interest in a specific contract. By entering the orders, often in substantial size relative to the contracts' overall pending order volume, the market participant creates a misleading and artificial appearance of buy- or sell-side pressure. The market participant places these large orders at or near the best bid and offer prevailing in the market at the time. The market participant benefits from the market's reaction by either receiving an execution on an already resting order on the opposite side of the book from the larger order(s) or by obtaining an execution by entering an opposing side order subsequent to the market's reaction. Once the smaller orders are filled, the market participant cancels the large orders that had been designed to create the false appearance of market activity. Placing a bona fide order on one side of the market while entering order(s) on the other side of the market without intention to trade those orders violates Rule 575.

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5. *real examples :*
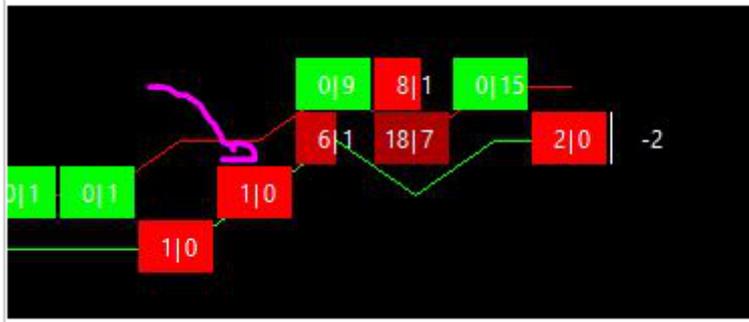
maché a vendor contract that raised the price of 1 tick. Absoluemment illogical from a pure economic perspective, because in total contradiction with the theoretical laws of supply and demand. Indeed, sales market are expected to lower the price (or not to move to); like shopping at markets are expected to drive up the price (or not to move to). This phenomenon, illogical from a certain point of view, makes sense when you understand what it shows: a price decision-making power at the execution of market orders. This power belongs to the liquidity provider.
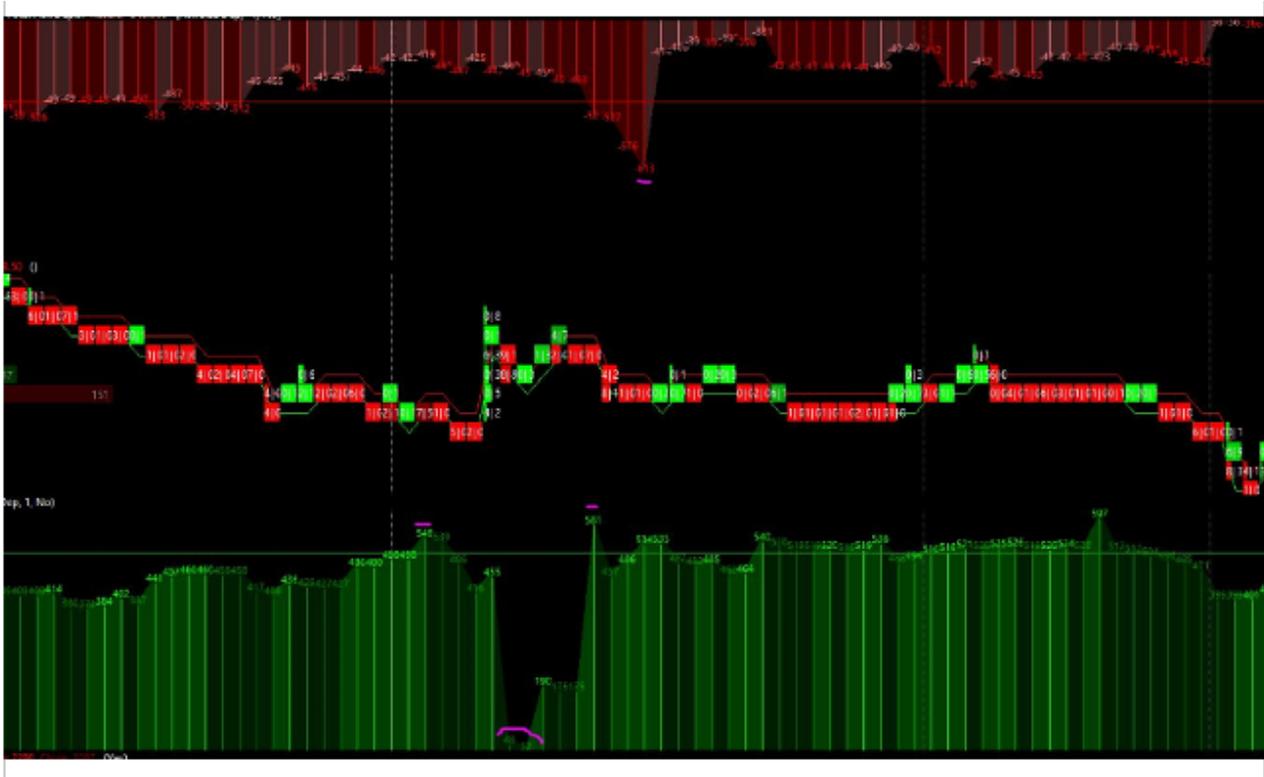
a structure of the bid book (green buyer side) that goes from "all" to "nothing" (more than 400 to less than 50 in less than one second); showing that it is very likely one and the same algo, at that time, which makes the buyer liquidity to notes. It is revealing absoluemment monopoly that the HFT algo that provide liquidity to the market via the order book.

2) Prices:

1. Definitions and characteristics:

* The price of an asset x is a reflection of the value of this asset x. It is measured in monetary unit (currency) as the euro, the dollar, or mark (tick); that is to say by variation level.

We can distinguish two main types of values:

-> The perceived value: the value that is perceived by the operators; it is a psychological value, which is at a price agreed by a majority of operators. In the minds of market participants, it is a fair price, which takes into account all elements, since it is supposed to reflect the supply and demand and is believed (logically) be in line with economic fundamentals (all at least the political and monetary fundamentals)

-> Fundamental value: it is a value calculated according to the active own items in question. One can for example determine this value to an index, calculating the price of each share is composed. The fundamental value somewhere illustrates the "real" price. The intrinsic asset prices, its true value.

* This is when there is discrepancy between the perceived value and the fundamental value, the price will move and adjust, so that the two values match in the same ranks of prices, new created.

* The price of an asset will therefore x value based on several parameters:

economic: such a big company will announce its annual profits as APPL, it will impact the price of the nasdaq.

policies: for example a policy rate of ascent decision at the central bank, this will impact all markets, because the perception of value will change.

geopolitics: for example, the construction of a pipeline through iran instead of going through the turkey ... this will impact the price of oil.

Political: eg raising the ceiling of US debt, which will also change the perception of value, and therefore the price.

Financial: for example an increase in margins recquises for some futures contracts; that impact the price of the underlying of this contract.

Technology: for example the speed limit of issuance and cancellation of limit orders for different operators will also directly impact the price, I would de facto.

Legal: for example the legalization of a certain opacity of a lot of products like binary options, forex, CFD's, etc.

and finally technical: that is, that in the end, it is the market orders, limit orders and (motivated by the choice of operators that act / react to all the above mentioned elements) that will create price movements, by confrontation.

2. Study of historical:

Through various flows, forex, futures, CFD, etc; tradeur each will have the opportunity to study a

history of price action, or long: between 5-40 years of price history in terms of flow providers.

What are the general findings we will be able to do after studying these historical?

There are correlations and decorrelations quite marked among assets, and among asset classes.

generally will classify financial assets into two general categories:

* Risky assets (indices, some currencies, some short Bond)
* Shelters assets (precious metals, long bonds, dollar, etc.)

We will also classify financial assets into groups:

* Stock indexes: compounds of shares
* Major currencies: are traded in pairs.
* Minor and exotic currencies: much less liquid.
* The obligations souverainnes: very liquid and normally "safe haven"
* Corporate bonds: corporate debt.
* Raw materials: copper, aluminum, iron, etc.
* Agricultural materials: soy, palm oil, cotton, etc.
* Precious metals: gold, silver, platinum, palladium.
* Energies: petroleum, gas, uranium, lithium, etc.

These correlations among groups, among groups, or among assets will be established, and change over time. and will be measured:

by differences in the relative performance among assets%.
by timing differences in the pricing of assets.

The study of historical over the last 10 years indicates that:

* There are trends (change between perceived value and the fundamental value), and there are ranges (balance between perceived value and the fundamental value).
* The price is in range, so balance 70% of the time.
* Price is in trend, so in "inneficience" 30% of the time.
* Price volatility is very cyclical: ie as volatility increases follow one another to the volatility decreases.
* Réccurentes of price patterns exist on the price charts.
* But the consequences and effects of these patterns chartists, what will happen to the prices then are not clearly recurring.
  • Shows that the behavior of the price action has changed since the avément HFT trading (2005).

3. Technical indicators :

Epaule Tête Epaule (ETE)
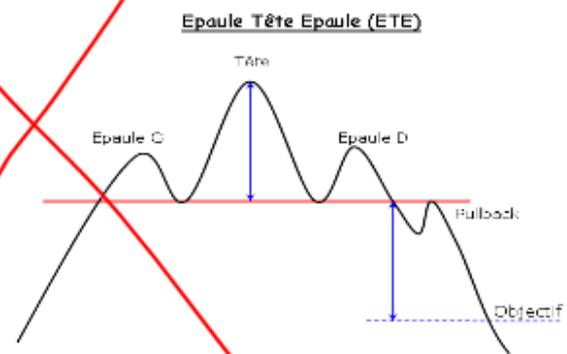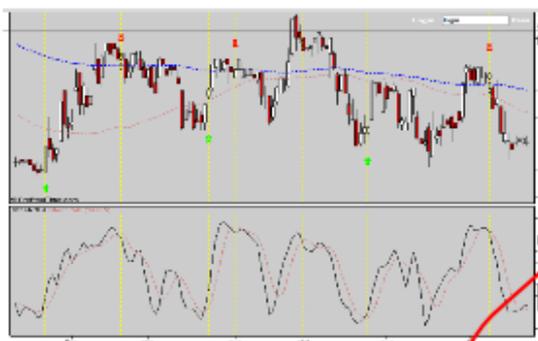
RSI, Stochastics, Macd, Bollinger Bands, center of gravity, Chartism, technical analysis, etc, etc: all that you already know.

The findings:

All these indicators are based on the price action exclusively.
everyone says that we must work with these indicators there.
90% of retails and professionals use these indicators there tradeurs
90% of retails and professionals say tradeurs make money with these things as social networks
90% of them will lose money, according to regulators
most of these indicators are in fact only repaint prices.

Or, is it the historical prices that make future prices?
Not really...

4. The price components:

Price movements will be measured by tick or point, and will be established as and as time passes.

The tick is the smallest increment of change in the price of an asset. It will vary according to each asset.

For example the e mini futures sp500, the value of a tick is equal to 0.25 points. This is the smallest increment possible variation (the smallest possible movement); the sp500 therefore move 0.25 points by 0.25 points. On this asset, 1 point sp500 is also 4 tick; 1 tick or equal to 0.25 points.

Why the price is going to move?

* The price will go up, because someone wants to buy time x and the price is more than what is available for sale at this time x and at this price it.
* The price will go down, because someone wants to sell at time x and the price is more than what is available to buy at this point x and at this price it.

For example :

Suppose a shop in the desert with a seller in this store that sells bottled water at 2 euros a bottle.

This 50 in stock available for sale at a price of 2 euros.

A family arrives in the store, they take 3 bottles of water. The price does not move: 2 euros (3 for market purchases is less than 50 limits sales).

Half an hour later, a US thirsty because of tourriste arrive in the store the bottle seller ... They are 40 and want all 2 bottle of water .... well fresh or 80 bottles desired total to 47 bottles available for sale. What is happening then?

The seller will sign his return and the posted price of 2 euros will rise to 5 euros. Welcome America!

The first 47 (or last lol) bottles will be sold at 5 euros each to the first arrivals.

This is how the price rose 2 euros a bottle at 5 euros a bottle, simply via a structural change mechanism at the level of market orders flow .. (American bottles buyers market that arrived massively in soudainemment an empty desert tourristes buyers).

The vendor has adapted the structure of its available supply by putting limit orders (bottles) directly to the price of 5 euros: to make it back just ask its limit of 2 to 5 euros .. and seen it all alone in the desert (in the book); the best selling price and pass directly to 5 euros.

Thus, to conclude this point: from the time the seller / drug dealer (MM) is the majority of the offer to notes, it has a control potential of the high price.

So there will be the final two distinct components that will determine the price:

Liquidity: is a set of limit orders (purchase and sale) available at book and placed in the execution waiting, and who will therefore be a liquidity provision. These limits are beings limit orders placed on different prices on each side of the book: the buyer left limit orders down in green; and right limit orders top seller in red. Measuring the book's structure changes (the flow of orders limit the book) primarily by studying the additions and deletions of limit orders.

Volume: that is a set of market orders (buyers and sellers) executed, and visible in the time and sales (tape) or directly in the footprint, which will represent a liquidity consumption. The volume will consume the available liquidity: the market will consume orders limit orders. We find in these orders footprint green buyers market right from the box, and these orders red sellers in markets left of the box. Measuring the flow of structural change orders market primarily by studying the degree of balance / imbalance in meaning market orders, the speed of flow of market orders, and the amounts of these markets volumes.

To simplify, there will be:

Purchases and sales market: Buy and Sell Market Order Market Order
purchases and sales book: Bid and Ask Limit Order Limit Order

To synthesize:

Buy Market Order> Ask Limit Order = price rises
Sell Market Order> Bid Limit Order = price drop

   5.   **Real Examples :**

CL (Crude Oil) : may 2016 contract : 11H27 AM CET.
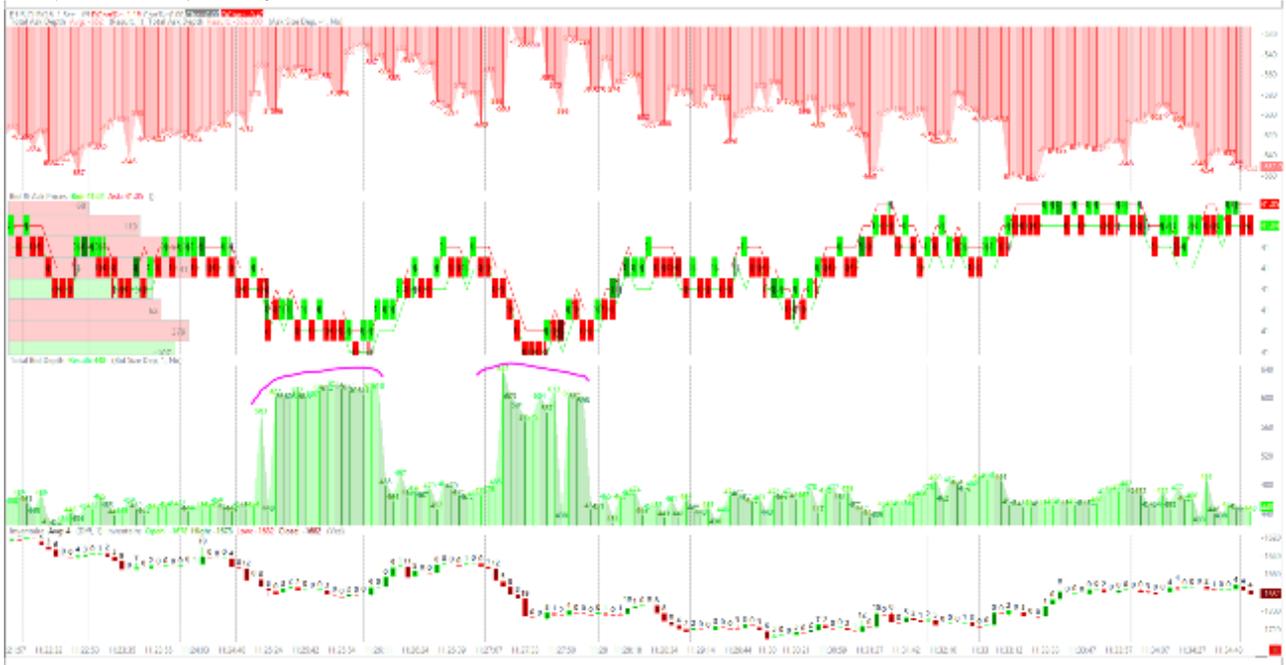
In this graph of oil, we can see at the beginning the price drop, while the bid book (buyer side) starts suddenly swell from 450 to more than 600 orders limits available for purchase. Creating a dual W bottom with even more markets sales in the second leg. It is clear from this example as the available liquidity in the order book will directly condition the bullish price movement ensuing.

- *FDAX (German30) contract in June 2016: 5:19 p.m.*

The ask of the book (seller side) goes from 230 to 100 added 339..on limit orders, half of the liquidity available just before. The result is clear: 5-6 seconds later, the decline starts.

FDAX (German30) : June contract 2016 : 16H12 PM CET
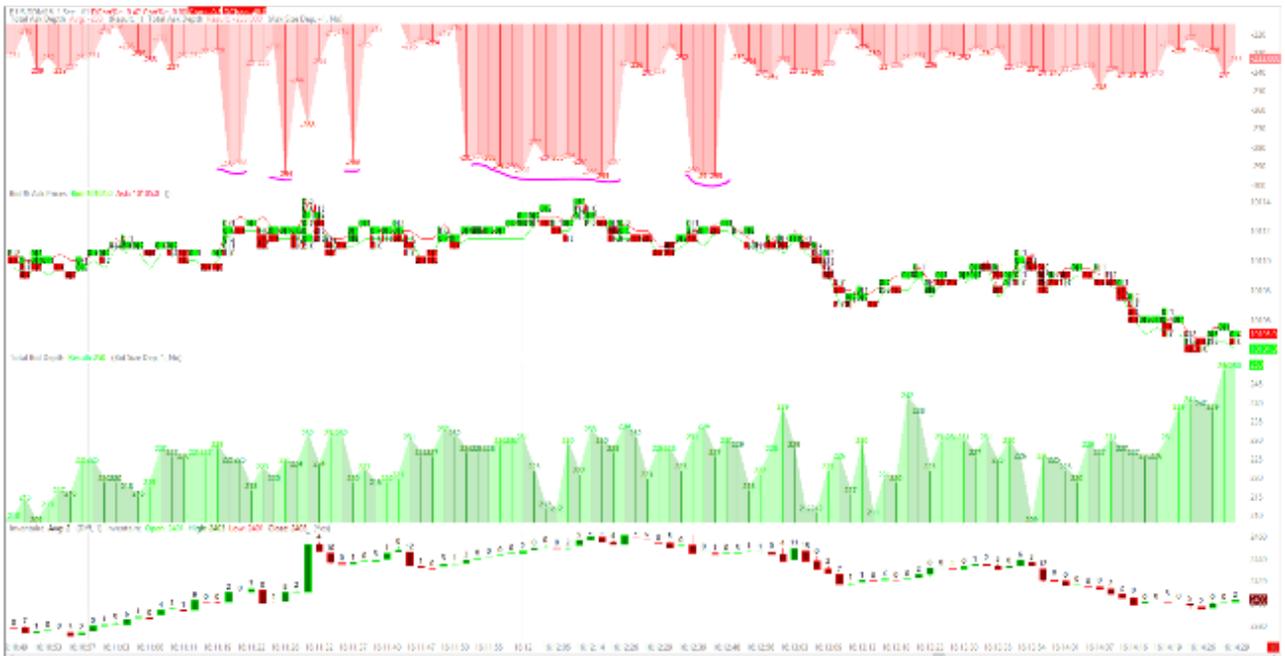
In this example it is noted intéréssant action prices rising less strong, despite a large purchase market visible in the inventory down. Note also that settles the selling pressure in the depth of the book ask. At first it does not take too much, but when the price goes up even a little, it holds much better ... (action / reaction). The decline that have followed.

- *Sp500 Emini (SP500) contract in June 2016: 4:01*
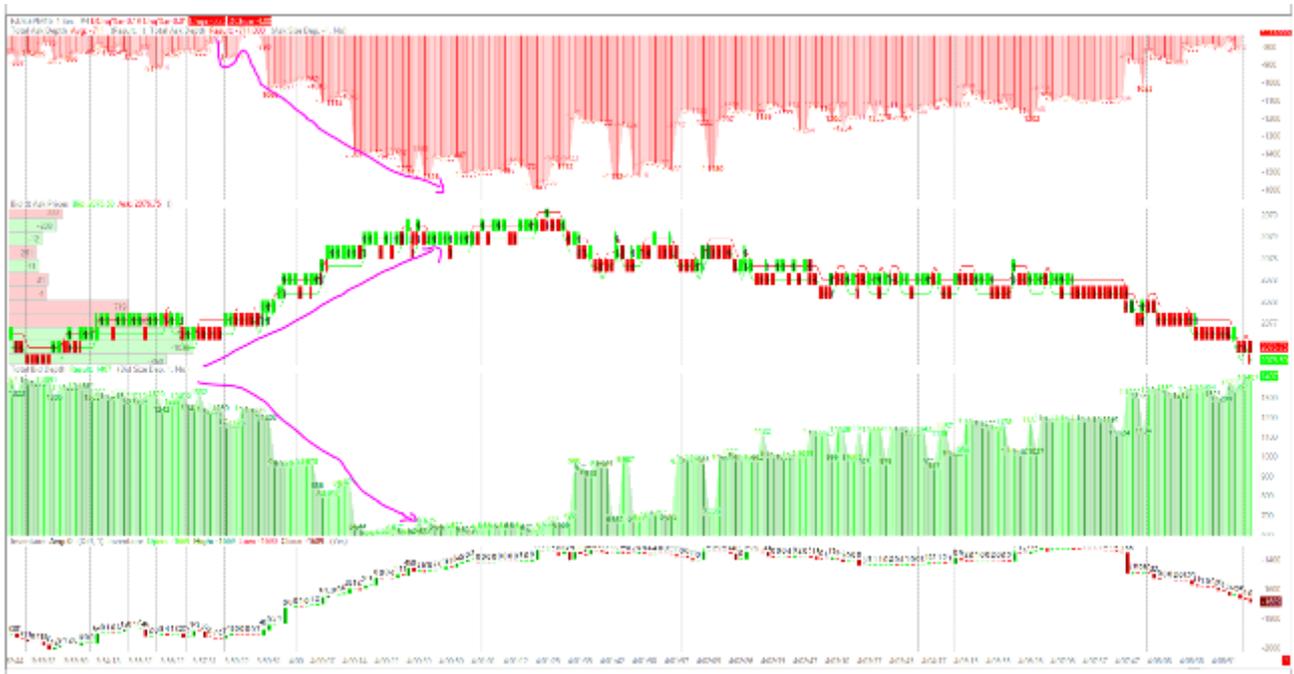
On this chart as the situation is clear asse ... a price that goes with buying market volume, while the depth of the bid book (buyer side) and decreases as the price rises to decrease at the end of race half! The ask Depth increases quite considerably as: mulitplié 2 .. What is removed is probably the bid awarded to ask: a rather interesting and revealing symmetry.

3) Volumes:

Volume is traditionally a term used to describe the amount of orders that were traded markets (executed only). executed contracts buyers and sellers at the market. We will be able to measure and display these volumes executed at the market through various forms and tools.

The volume will be characterized by these main elements:

the amount of contracts (10, 20, 30, etc.): these contracts amounts can be measured by unit, but also in notional value ($ or Euro)

the meaning of the contract (purchase or sale market to market)

the time and date on which the contract was executed (April 8, 2016 12h.14min.34sec.555ms)

We will consider the volume as a whole: -> the flow of orders Market:

From the study of this market order flow will stem the following concepts:

speed to market orders flow (contract numbers per second market) that speed and average speed will be measured this, to have standards, to better measure the proportions of what is out standards in terms of speed . Thus, accelerations and decelerations can be used as criteria for decision making.

degree of balance or imbalance of the market order flow (in terms of purchases / sales): we look to see if there is more buying market as sales market, in terms of flow: is that was ten consecutive sales and purchases two, and again ten consecutive sales (flow imbalance for sale); or is what was such a purchase, sale, purchase, sale, purchase two, three sales, purchases a two sales (balanced flow).

impact of market orders flow (vs impact impact of market buyers market sellers): the impact of market orders on the price can be measured by looking at the performance: this is the contract moves the price? Yes or no? If yes: no impact on the price. If not: what is the contract raised the price? Or lower the price? How many tick? (Slippage).

The Auction Market Theory:

Some basic reminders:

-> Prices rise to motivate market volume seller and the buyer to discourage market volume.

-> Prices fall to motivate the buyer market volume, and to discourage the volume seller market.

-> If anyone can buy, there is inevitably someone who sells it.

Thread of the auction:

-> We will first seek to evaluate the price, based on the prices of previous transactions and sales volume in order to get an idea of just valeure product.

-> We will then set a price slightly above the valuation price with limit orders to attract people. Motivate demand.

-> Then we will wait for the "response": the answer is when the demand arises. The concept of response is important because it illustrates the action / reaction of the two camps.

-> We go after, re evaluate the price, depending on the nature of the response, and wait for a new answer. The price will be re evaluated directly via a new structure to the offer has adapted to the response.

-> The goal is to generate transaction to the volume, and thus commissions. To a maximum of transaction, it is necessary that the price is "fair" and accepted by buyers and sellers.

-> The difference between the best bid price and the best demand price will represent spread. This will be the gap between the claims of purchases and sales limits operators.

-> The transaction will happen, when one of the buyers or sellers market, will accept the spread of other, hitting the market: ie, will attack the other; will pay the spread on the other, to complete the transaction and conclude the deal.

-> For each transaction as and as time passes, we will therefore, sometimes a price too high, sometimes too low a price, sometimes the value between the two. Generally, it is the retails acting between the two valeures; and institutional and professionals working on the extremes of the valeure.

-> The aim of the auction is to find the price that corresponds to the fair value of the asset or the product in question, evaluate and set the right price.

2. types of measures:

To measure market volumes (orders executed in the market) are mainly used:

-> Time: Vertical market volume histogram that prints over a defined period of time, eg, 1 second: and there will be a market volume data for each second. It is therefore the volume accumulated over time. One can thus know how many contract the market went into a specific space and time.

Comparing the market volumes over time will allow us to measure the end the interest of the market, for a price movement or another

-> Price: horizontal volume profile that represent the amounts of cumulative market volumes on each price levels. The purpose of this type of volume measurement market determines the price zones that have been accepted or rejected (in terms of volume). The more volume done in a zone + it will be deemed acceptance zone. And inversémment least there will be a volume area; and it will be considered a rejection zone.

Thus, by collecting market data volumes with respect to time and price; we will be able to

determine standards, making averages; to judge, ultimately, if the volumes are above or below standard. The purpose is to identify strong volume and / or low volumes.

3. readings tools:

-> Read history tool market orders and sales is the time (or tape); it is a kind of market sales slip, where it is printed all orders existing markets. All transactions executed only, long and short, are recorded in this tool the tape. We thus find for each transaction the direction of trades, the amounts, and schedule of trade.

-> The most recent reading tool of market orders is the graphic footprint; This is a graph that will show us changing market orders with respect to time and price.

Column 1:

```
20:03:56  1,0741   1
20:03:56  1,0741   1
20:03:54  1,0742   1
20:03:54  1,0741   1
20:03:52  1,0741   1
20:03:52  1,0741   9
20:03:52  1,0741   1
20:03:52  1,0741   3
20:03:52  1,0741   2
20:03:52  1,0741   1
20:03:52  1,0741   8
20:03:52  1,0741   15
20:03:52  1,0741   3
20:03:52  1,0741   4
20:03:52  1,0742   6
20:03:52  1,0742   3
20:03:47  1,0742   1
20:03:46  1,0742   1
20:03:46  1,0742   1
20:03:46  1,0742   1
20:03:46  1,0742   1
20:03:46  1,0742   1
20:03:46  1,0742   1
20:03:46  1,0742   1
20:03:46  1,0742   2
20:03:46  1,0741   1
20:03:46  1,0741   1
20:03:46  1,0742   1
20:03:46  1,0742   1
20:03:46  1,0742   35
20:03:44  1,0743   1
20:03:41  1,0743   2
20:03:41  1,0743   2
20:03:41  1,0743   1
20:03:41  1,0743   1
20:03:41  1,0743   2
20:03:41  1,0743   1
20:03:41  1,0743   2
20:03:41  1,0743   2
20:03:41  1,0743   2
20:03:41  1,0743   1
20:03:40  1,0742   6
20:03:40  1,0742   8
20:03:40  1,0742   67
20:03:40  1,0743   34
20:03:39  1,0743   23
20:03:30  1,0743   5
20:03:30  1,0744   30
20:03:24  1,0745   1
20:03:14  1,0745   1
20:03:14  1,0745   5
20:03:14  1,0745   1
20:03:05  1,0745   4
20:03:05  1,0745   4
20:03:05  1,0745   1
20:02:58  1,0745   1
20:02:56  1,0745   1
20:02:56  1,0745   1
20:02:56  1,0745   1
20:02:55  1,0745   2
20:02:55  1,0745   2
20:02:55  1,0745   2
20:02:55  1,0745   2
20:02:55  1,0745   27
20:02:52  1,0745   19
```

Column 2:

```
20:02:56  1,0745   1
20:02:55  1,0745   2
20:02:55  1,0745   2
20:02:55  1,0745   2
20:02:55  1,0745   2
20:02:55  1,0745   27
20:02:52  1,0745   19
20:02:52  1,0745   15
20:02:52  1,0745   22
20:02:52  1,0745   1
20:02:46  1,0746   1
20:02:46  1,0746   1
20:02:46  1,0746   8
20:02:46  1,0746   2
20:02:46  1,0746   2
20:02:46  1,0746   1
20:02:46  1,0746   8
20:02:46  1,0746   8
20:02:39  1,0746   1
20:02:39  1,0747   19
20:02:33  1,0748   5
20:02:31  1,0748   3
20:02:31  1,0748   53
20:02:20  1,0749   1
20:02:20  1,0749   2
20:02:20  1,0749   6
20:02:18  1,0749   1
20:02:18  1,0749   1
20:02:18  1,0749   2
20:02:15  1,0749   2
20:02:15  1,0749   1
20:02:14  1,0749   1
20:02:14  1,0749   1
20:02:14  1,0749   2
20:02:14  1,0749   6
20:02:14  1,0749   2
20:02:12  1,0748   4
20:02:12  1,0748   8
20:02:12  1,0748   1
20:02:10  1,0748   1
20:02:10  1,0748   7
20:02:10  1,0748   2
20:02:10  1,0748   2
20:02:10  1,0748   1
20:02:10  1,0748   4
20:02:10  1,0748   7
20:02:06  1,0748   1
20:02:05  1,0748   14
20:02:05  1,0748   8
20:02:03  1,0747   1
20:02:03  1,0747   8
```

Column 3:

```
14:49:59  1,1167   1
14:49:57  1,1169   2
14:49:56  1,1168   4
14:49:56  1,1168   3
14:49:56  1,1168   4
14:49:56  1,1168   3
14:49:56  1,1168   8
14:49:56  1,1169   1
14:49:56  1,1169   1
14:49:55  1,1169   2
14:49:55  1,1169   3
14:49:55  1,1169   12
14:49:55  1,1169   9
14:49:55  1,1169   2
14:49:55  1,1169   1
14:49:55  1,1169   2
14:49:55  1,1169   2
14:49:55  1,1169   2
14:49:55  1,1169   14
14:49:55  1,1169   11
14:49:55  1,1169   1
14:49:55  1,1169   11
14:49:55  1,1169   1
14:49:54  1,1169   11
14:49:50  1,1168   2
14:49:49  1,1168   1
14:49:49  1,1169   1
14:49:49  1,1169   3
14:49:49  1,1169   8
14:49:49  1,1168   1
14:49:49  1,1168   1
14:49:49  1,1168   7
14:49:49  1,1168   2
14:49:49  1,1168   16
14:49:47  1,1168   1
14:49:47  1,1168   2
14:49:47  1,1168   5
14:49:47  1,1168   1
14:49:47  1,1168   1
14:49:47  1,1168   2
14:49:47  1,1168   2
14:49:47  1,1167   3
14:49:47  1,1168   1
14:49:47  1,1168   3
14:49:47  1,1168   8
14:49:47  1,1168   5
14:49:47  1,1168   1
14:49:47  1,1168   4
14:49:47  1,1168   3
14:49:47  1,1168   8
14:49:47  1,1168   6
14:49:47  1,1168   3
14:49:47  1,1168   20
14:49:47  1,1168   2
14:49:47  1,1169   2
14:49:47  1,1169   1
14:49:47  1,1169   1
14:49:47  1,1169   1
14:49:47  1,1169   6
14:49:47  1,1169   1
14:49:47  1,1169   8
14:49:47  1,1169   3
14:49:47  1,1169   3
14:49:47  1,1169   3
14:49:47  1,1169   8
```

Column 4:

```
18:11:13  2037,50   152
18:11:13  2037,25   148
18:10:43  2037,25   119
18:09:19  2038,00   102
18:08:58  2039,00   173
18:08:57  2038,50   103
18:08:31  2037,75   118
18:07:58  2037,25   163
18:07:46  2037,00   136
18:02:46  2036,00   209
18:02:46  2035,50   139
18:02:45  2035,50   104
17:59:45  2034,50   146
17:59:05  2033,75   127
17:58:50  2033,75   149
17:55:07  2034,25   158
17:55:05  2034,00   251
17:55:05  2034,00   138
17:54:44  2033,00   154
17:54:42  2033,25   174
17:54:31  2033,00   101
17:53:09  2032,25   100
17:52:11  2032,50   164
17:50:40  2031,50   157
17:50:16  2031,25   100
17:50:14  2031,00   135
17:50:10  2030,75   107
17:49:56  2030,75   123
17:49:50  2030,50   177
17:49:30  2031,00   100
17:47:57  2032,50   100
17:47:39  2032,75   102
17:46:29  2032,25   100
```

Column 5:

```
18:10:31  2037,00   100
18:10:08  2037,50   134
18:09:49  2037,50   111
18:09:05  2038,50   105
18:09:05  2038,75   112
18:07:03  2036,75   100
18:06:37  2036,00   415
18:06:16  2036,25   170
18:05:21  2035,50   131
18:03:37  2036,25   159
18:03:15  2036,00   135
18:02:59  2036,00   166
18:00:38  2033,50   125
17:59:24  2033,75   100
17:57:37  2033,00   305
17:57:37  2033,25   195
17:56:18  2033,50   131
17:56:10  2033,50   101
17:56:10  2033,75   130
17:56:02  2033,50   179
17:54:33  2032,50   141
17:54:31  2032,75   123
17:53:33  2032,00   141
17:51:41  2032,00   109
17:50:31  2031,25   100
17:49:58  2030,50   103
17:49:44  2030,50   173
17:49:43  2030,50   100
17:49:08  2030,75   106
17:49:05  2031,00   170
17:49:05  2031,00   163
17:49:05  2031,25   110
17:48:56  2031,50   164
17:48:42  2032,00   151
```

4. actual examples:

To illustrate the succinct content of the theoretical part of the volume (the flow of market orders), we take as an example different setups reels from the 2015 market configurations and 2016. We will use these examples to illustrate the concepts and principles general views above. All samples will come from future contract with flow data CSB and CQG
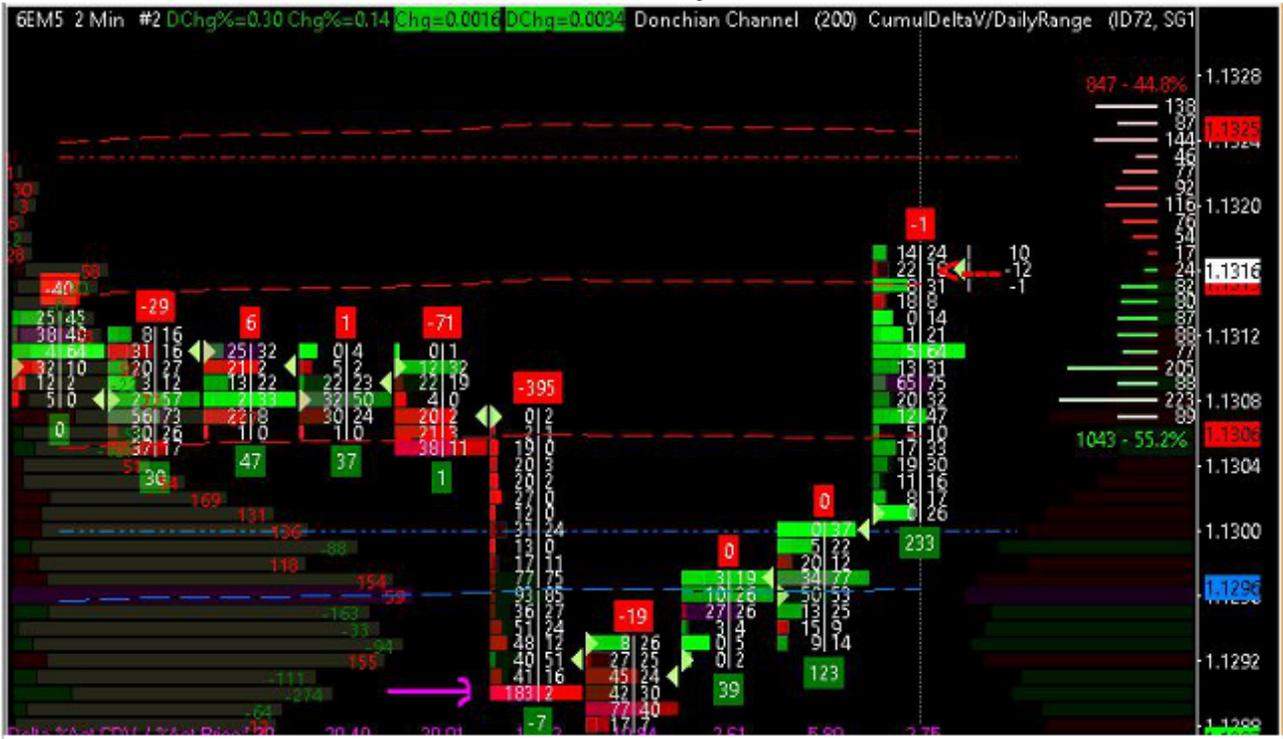

a) In this graph footprint UT 2min 6E contract, one can note several interesting points that can invite a bland bearish movement.

Note that in the first 5 bars volatility is low, the price action is balanced, and market volumes are buyers (the herd buyer); he just has to see the color bars to realize. Then comes an imbalance of movement in price (down 18 tick); during this movement, we pass under the VWAP, and in the daily vpoc, and we see on the last level of price movement at the bottom of the bar, the largest volume market dealer (183 contracts, for an average of 25 sellers contracts by level of eye sight in price).

These various elements rather invite us to look for shopping, to work back inside. In terms of the auction, going from a saleswoman area to a purchasing area (as VWAP and under vpoc) it becomes a price that is below hence the fair value (fair value) and therefore may be potentially at intéréssant buy, to work a return to fair value: vpoc and / or market acceptance of VWAP = area.
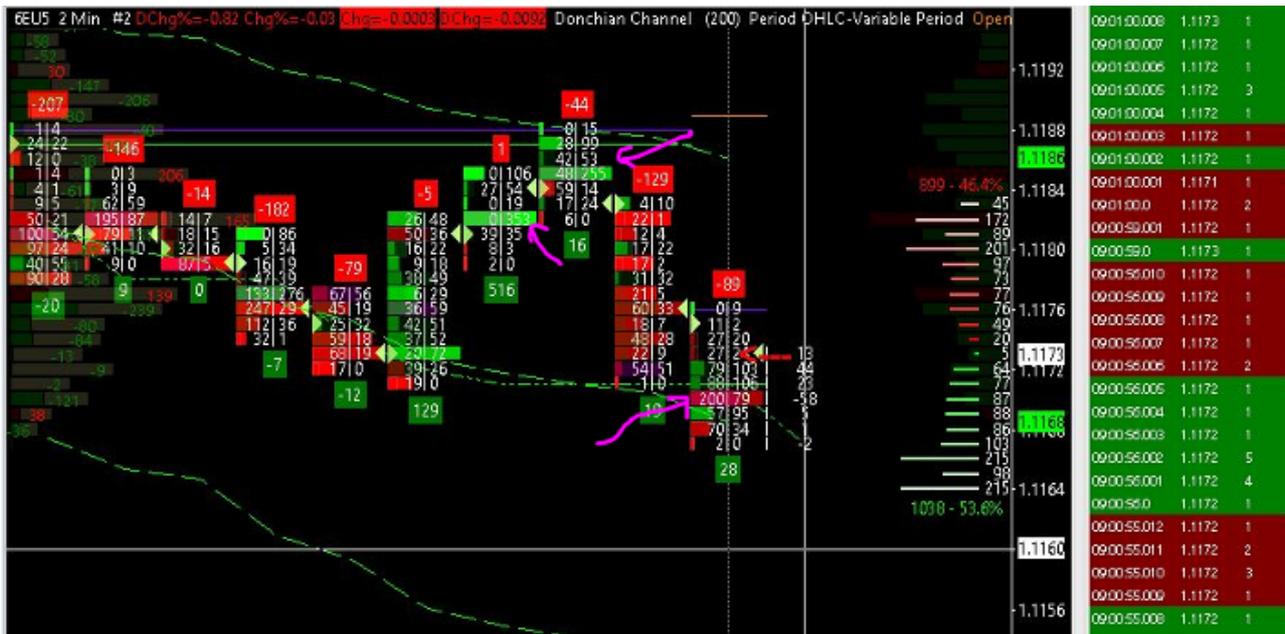
b) _On this chart footprint_ in UT2 min 6E contract, we can see that the price has expanded its range to the bottom; he then bounces within 3 bar less detailed in terms of range, while they are yet provided with much more volume buyers market in the first, which is yet greater. That means it costs to Ascending expensive to raise the price, and therefore, the liquid + side of the book at this point is the side boundary sellers (ask the depth). The less liquid side of the book at the time the bid is depth: this is where lies the fault, so the price may drop. two price levels should also be noted that the absorption of market orders by the buyer saleswoman limit is particularly high (353 and 255). These are areas of resistance. These areas there may be fadées and therefore sold to play inside a fallback, see a new extension of range to reach new buyers stops.
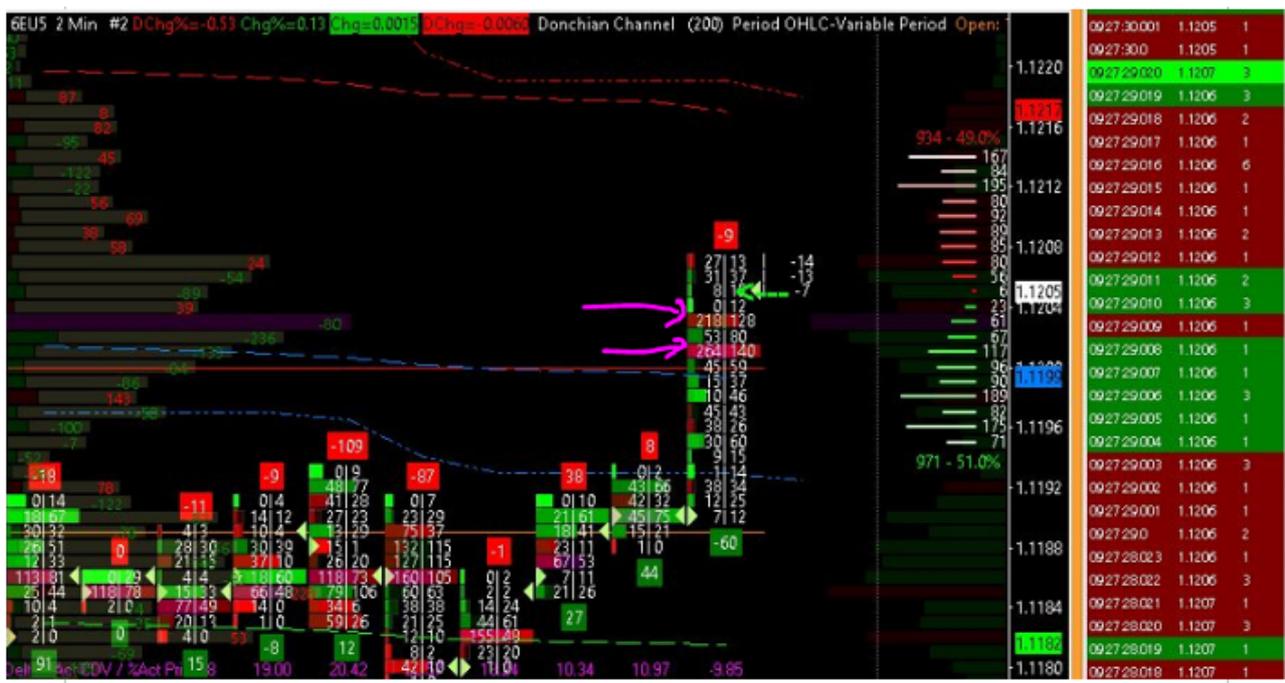
c) In this graph footprint UT 2min 6E contract, one can note several elements: in fact, the price action explodes on the rise, with volatility increasing, and a return to the top of the daily VWAP and vpoc; which may invite to think about sales, an auction terms.

That said, when you look at the market volume executed in the upper part of the bar upward reveals that the majority of the market herd seller ... It is not good to fade, but rather to buy good go with the price to play a breakdown of the stops of the vendors who have returned to the top of the bar position.
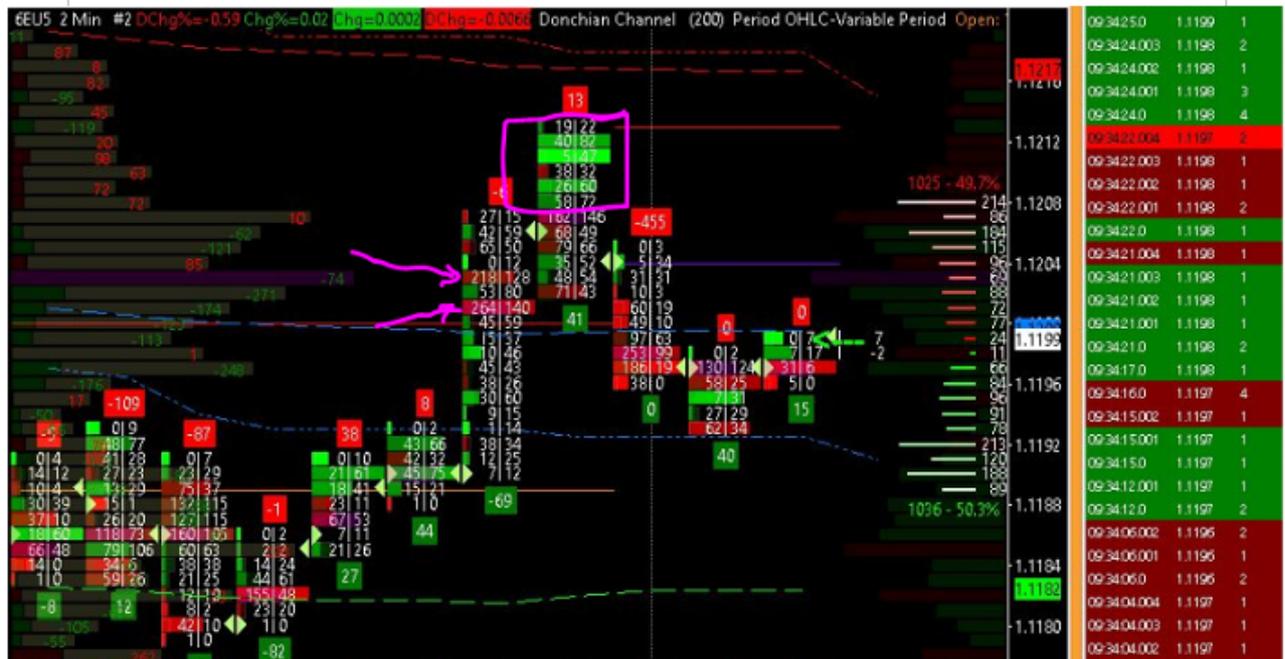
As seen in the pink framework, although a nice collection contracts buyers package (probably redemptions big arrow sales rose just before). finnallement We end up back inside the bullish explosion bar below the VWAP with new support in the other direction. Overall, and although this decline was in place; this structure is rather bullish.

d) of this example, we have a time and sales (tape) 6E contract in early Japanese opening. There is a first time buyer market block trades at 1.1017 1H12.03 on 65 contracts. The fact that this block of 65 contracts is highlighted in green indicates that it is a trade block; ie 65 contracts in one and the same trade, thus belonging to a single operator. We can also, if desired, calculate the size of this trade by multiplying the price of the contract by its cost per point then the number of contracts: either a position: 1.1017 * $ 10,000 point = $ 110,170 contract . 110 170 * 65 = 7,000,000 contracts 50 161 000 euros.

We are on a position of a professional or institutional operator. Note that generally these large block trade market are followed by HFT algo liquidity Taking that are programmed to sniff and track large market size. 53 seconds later, we see that there is a new block trade buyer strikes and is executed 4 tick above the last block trades buyer on 1.1021. What follows is a small new order flopped market smaller buyer, there probably retail for once, that will also follow in their turn towards buyers block trades. Finnallement found the price to 1.1024, 15 seconds later. So we climbed 7 tick in total compared to the price of the first trade block buyer.

e) on the candlestick charts UT 2 min 6E contract, we will see the evolution of the stock market making and price, and how to interpret.

On this chart 1 shows high-volume market seller in the inventory with an accumulation beyond 1000, and that notwithstanding that the price does not drop much, not down, then begins to rise. What does it mean? This means that it is expensive to bring down the price, but it is much cheaper to bring them up. We also see the netement enough to the eye without calculating anything; Inventory is located downstairs on the first yellow line (13% retracement) while the price it is between the two purple lines in the middle of its range (in the region of 50/60%). We are therefore on a bullish configuration in terms of inventory because the price diverges too much inventory; Price does not conform to the inventory.

On this chart 2 shows that the inventory stays where it is; ie that market volumes have "calmed down"; the volume quantities are smaller; the market order flow is balanced again and locates inventory, always at the bottom of its range. Despite this, it was the price continues to rise, and that came pil hair type the high of the day. Stops sellers above. We also note the close of the previous day close above that may be targets for out shopping. The setup remains fundamentally bullish, and this more than in Figure 1; because this time the price diverges from the inventory, I would say 100%. Price at the top of its range, inventory at the bottom of its range ... This illustrates a clear manipulation of limit order that offers the bid probably Ascending expensive.

In this graph we see that the price continues its ascent to the top; the high is exceeded, the close is exceeded the psychological threshold of 1.13 also, and the high of the previous day are 10 tick above the previous highest of days ... many key thresholds, beyond which the sellers are panicking position and redeem themselves; when the inventory begins to him to readjust, even if a disproportion remains. Indeed, the inventory remains below 38.2% of its range (sky blue line), while the price is still him at the top of its range, after having doubled that! A profit-taking is legitimate; That said we will wait that the high of the previous day is scraped and the inventory is adjusted even better before attempting sales. Note that the entire market volume is in the upper price spike, not the start of the movement.

On this chart we see the violent break of the high of the previous day, this time with the market volumes sizeable buyer for it (about 650 Delta); the adjustment continues, Ascending net, even if the break is severe, there is volatility, there are ranks of the extension; This is when all the sheep pass buyer, so this is the time when you need to seek the sale to work such a return on the high of the previous day.
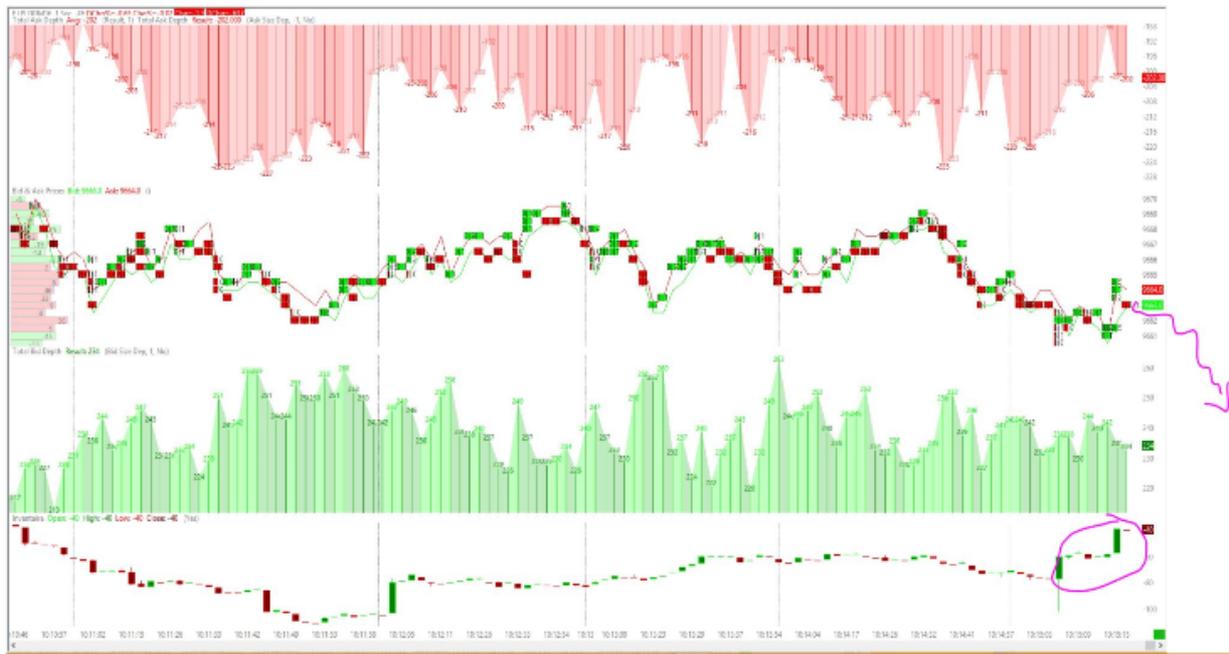
f) In this graph we will look again inventory management, and how the price will move in relation to this inventory, but this time on the dax, and on a scale 120 times smaller than that previously used: the unit time 1 second.

Note: the transition from UT 2 min at UT 1 second can be confusing at first glance. The fact is that the UT will be small + + reading accuracy will be. Moreover, the liquidity available liquidity of the book has a lot more sense in this UT where in higher UT.

Let the graph with some indications + on the study of the inventory:

Overall, what do we see? A price that is in range, in a very slightly bearish slope; but rather in the final range, with an inventory also rather in range, even if there is a bullish slope ligther.

From 10H15.05, however there is a process amplifier with two big strikes buyer market order flow that have a relatively small impact on the price (movement 2) in view of what it was just before in terms of vendor contract market to go down (movement 1). Basically, visually, and without looking at the numbers, we see pretty much it takes 2 times more contracts market buyer for up to 2 times less than before.

This reflects absorption from the limit order to ask to notes in the 9664/9660 area. In terms of pure stock play, so it's a setup fundamentally seller.

The following graph shows the price to eventually fall 9655, only 30 seconds later with an inventory that we tend to readjust property showing market volume seller (probably purchase resale on 10H15.21.

The conclusion made when reading inventory is that whatever the time unit, in the end, the logic remains the same whether the nano second, or hour or day. The volume, it remains the volume.

Whether on a chart 1 second chart 1 minute or hourly chart; when there is such a market order of 500 strikes in a single block, well, it will remain a block of 500 UT whatever we look.

But be careful not to fall into the extreme to think that the time notio would not be significant or neglect: not absoluemment not. However, even if the volume is nested at the price, the concept of time also will determine things (nottamment everything related to the time slicing algo, the execution of large customer orders, etc.)

4) liquidity:

Liquidity is probably the least notion easy to understand for someone who does not usually watch the evolution of prices finaciers markets in an order book.

1. Definition and characteristics:

Liquidity, limit orders are available for execution pending in the order book on each price levels. Unlike the volume market where it has executed orders; limit orders representing liquidity book will be, when to them, reflect claims or purchase and sales requirements.

A market order will be executed "directly", the best price and the best possible; while a limit order can not be executed, it can be removed, or partially or completely used at a desired price.

A limit order will provide liquidity and will be considered "passive", while a market order in turn will consume liquidity, and will therefore be considered as "active" and "aggressive".

Why the market order will be aggressive and the limit order will be passive?

A real example to answer this:

-> Let Mr. X who sell a house 200 000 in sales prices shown in the depth of the book ask. Mrs. Y when she wants to buy the same house and offers to bid 180 000 in best purchase price.

-> As a person will agree to buy at Mr. X selling price, or sell to the purchase of Madame Y price, there will be no transaction, but the pretensions of offers and applications.

-> Mr. X, pressed for time, eventually crack and ask her to put 180,000 on the best purchase price of Madame Y; he taps market at the best bid; the transaction is 180 000 euros. This is Mr. X the aggressor, because it is paid him the spread of EUR 20 000.

The special today on modern electronic financial markets is that liquidity is distributed in orders at speeds book, and at frequencies that exceed the average human mind: to give an order of magnitude, the market making HFT algos of the most sophisticated today have a capacity analysis of information and decision-making is done on the scale of the picosecond (10 -12 power).

Finally, if one considers that liquidity is one of the four dimensions of the price (price action / time / volume / liquidity), it will keep in mind that there are other (sub) dimensions, these famous dimensions " quantum "exclusively own liquidity, but that impact directly yet, the other 4 dimensions price (liquidity / volume / time / price).

You begin to catch a glimpse liquidity, volume, price and time are mutually interlinked and can quite be considered, moreover rightly as a single mathematical system.

2. different types of measures:

-> With respect to time:

Indeed, in view of the frequency and HFT algorithms response speed; the study of their activities to a complete and extremely short ladder saves grandemment accuracy in the analysis of what is happening. It may well want to investigate for example the speed of the bid quotation and trading speed to ask. The aim would be for example to determine the speed rating to notes of excessively high levels compared to average. Indeed, the highs and lows of the market points, algo market making HFT tend to increase the speed of the trading book to cover their tracks, slow stream, and send a lot of information to process other algorithms competitors to increase their time reactions.

-> In relation to the price action:

indeed also, one can quite look for divergences and convergences between changes in liquidity to bid and the ask in the order book, and price trends upward and downward. When the two differ is usually there taking a control that is about to be carried out by operators working in limit orders. It can for example serve this reading of these two elements to possibly validate (or not) a pattern of action distinct price (ETE, triangle, flag, or harmonic pattern, etc.)

-> Over liquidity averages:

After having identified and or calculate what liquidity "normal", ie the average liquidity, the hours you work; you can quickly locate enough everything will be exceptional when it will happen. Having liquidity averages, liquidity standards, will also allow you to better measure the proportions in which occur liquidity phenomena that are outside the norm.

-> From markets volumes:

to the extent that liquidity available order book is offered; it is quite logical, very sensible and legitimate to compare it to what happens in front in markets volumes that are coming consume this liquidity, which will then come withdraw literally available liquidity, which will be pleased , after consumption. It is clear that if you see after a big hit market, one facing liquidity that has evolved completely abnormal way; this will give you a key indication of the behavior of operators to notes (defensive avoidance behavior, aggressive or absorption)

-> In relation to the inventory:

It is also complete and extremely intéréssant to reconcile in his reading of the markets, both the notion of liquidity, and the notion of inventory market making. Indeed, by matching both in reading, when converging; this is a strong indication; it generally confirms that that is about to happen to the book is not a bluff. This helps very often to distinguish right from wrong in the order book. For example when you see it in the spoof book with big orders; it is good to watch if, every time you withdraw the order of spoofing before adding it again, it is consumed or just cancel.

-> Compared to what's available there in front (ask depth <-> bid depth):

Just yes. You look for example what is the bid depth, automatically you will want to compare it with what is in front at the depth ask. This comparison can be done statically, as quite dynamic for greater relevance in the analysis. This will foolishly compare to the bid amounts with the amounts to ask, but also, above all, compare the evolution of these quantities to the bid, and the evolution of these quantities to ask: the purpose is to better visualize the process of additions / withdrawals of orders limits of each of both sides of the book.

-> In relation to the spread:

It is also quite highlight the relationship between changes in spreads of the order book (between the best bid and best ask) with price changes that move with respect to time. There are correlations between nottamment increasing the spread, and the increase in volatility; is even besides the final mechanical report, more than a technical correlation.
That said what is established is that changes in spreads will impact the flow of market orders, which will therefore impact the price.

-> Over the key price thresholds:

It is also quite possible to compare the liquidity of the book with different thresholds with key price we could determine upstream graces eg volume profile (profile peak and trough) but also for example thanks to the open / high / low / close, psychological areas, or areas of stops.
We will keep in mind however that the estimated price levels "keys" and determined upstream will not constitute purchase levels or automatic sale, but rather levels of observation key prices.

Finally, and given the sheer nesting of the following four elements: price, time, volume and liquidity; it is clear that the possibilities of action within this single system composed of these four elements, are truly numerous.

- *Example* for reading of liquidity compared to the price and time with the level 1 of the quantbook FDAX contract in June 2016:
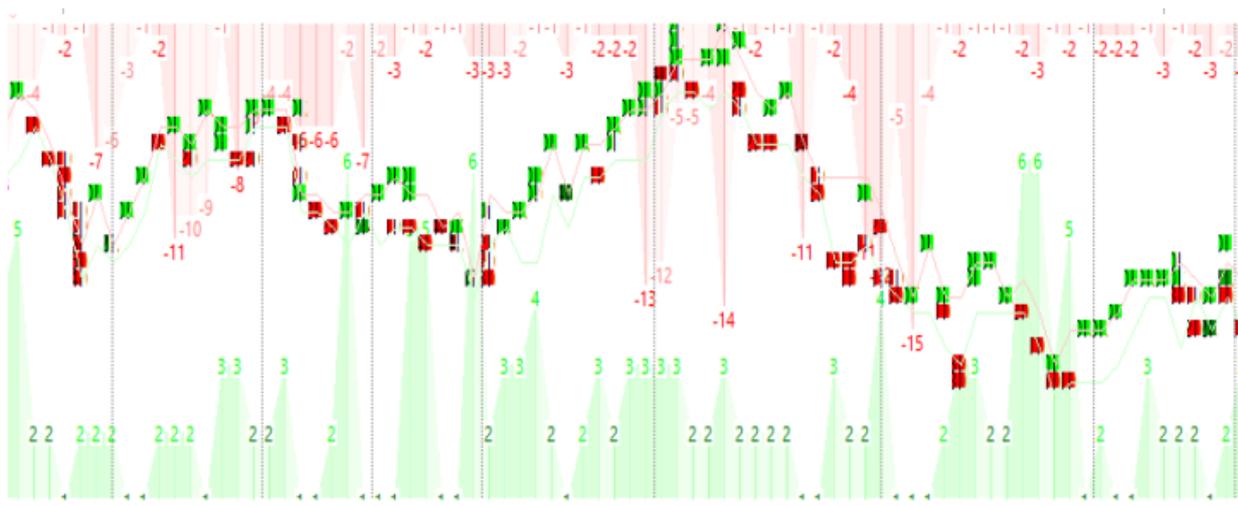
3. Reading Tools :

- **→ X trader orderbook standard :**

This is a classic order book with a gray colone in prices, colone bid in blue on the left and ask colone red right where you can see the limit orders waiting to buying and selling in the notebook.

-
- The refresh rate ranges from 5 to 200 milli second, depending notebooks / platforms / flow; but no history available liquidity is printed and / or saved somewhere. The flow arrives, appears and disappears automatically at each change in structure of the book. Nothing is saved in terms of informative data, except those relating to your trades.

-
- There are ultimately only 3 information displayed dynamically in a table: the price, the orders expectations for purchase (bid size), and pending orders for sale (ask size).

-
- This therefore requires a high degree of concentration in reading, because nothing is printed in time, forcing to use his memory quite intensely to remember what happened, and to compare to what happens.

-
- It is difficult to see réccurents setups that occur and recur regularly because there is no established function to graphically visualize the liquidity of the book. This therefore requires making a lot of screen time in order to successfully develop a certain "feel" a certain ease, allowing you to (unwittingly or not) to validate relevant experience in reading, and decision-making with this type of tool: the book

→ JigSaw Orderbook : Depth and Sales with added/removed orders :

Bid Vol	Bid	Bid	Price	Ask	Ask	Ask	Ask	Size	Size
			62.75					493	
			62.50					553	
			62.25					391	
			62.00					699	18
			61.75					422	2
			61.50					389	12
150			61.25					365	2
514		57	61.00					445	64
2465	971	655	60.75			166	193	42	220
1883	85	273	60.50	74	229	60	246		
4517	888	605	60.25	3	244	151	47		
4388	51	65	60.00	11	272	1	65		
4800	1		59.75	3	290	1			
4833			59.50	-6	383				
4426			59.25	1	392				
4035			59.00		527				
3808			58.75		409				
6050			58.50		474				
4336			58.25		500				
2428			58.00		3720				
1757			57.75						
2228			57.50						
561			57.25						
509			57.00						
76			56.75						
83			56.50						
91			56.25						
267			56.00						
685			55.75						
			55.50						
			55.25						
			55.00						
			54.75						
			54.50						

ES 09-14 Account ******

This order book is slightly more developed, in the sense that there is a little more information to process than in a standard order book: in fact, right now there are two columns and ask for two columns for the bid.

-
- These two columns ask for the size (in red on the right) and the bid size (blue left) notebook will represent two elements: the first two, those closest to the center of the DOM will represent the quantity of orders limits available for each price level. They just next (blue and always red) will represent her when the delta limit orders added / removed on all price levels.
-
- A negative delta in these columns mean a withdrawal limit orders (ie a decrease), while a positive delta in these columns mean adding a limit orders (ie increase).
-
- Also featured as standard elements of the total volume buyer and seller by price level, and the total market volume.

→ The Power Metter :

It is a measuring gauge of the available liquidity of the book: it is noted directly that there are two columns in the gauges, as well as small black lines to divide the columns into 8 equal parts.

·

· In the left column, bottom, green, you see the total of the top 10 levels of depth of the book: the top 10 buyers limit orders. Top red, we see the total depth of the top 10 levels of the book: the 10 best sellers limit orders.

In the right column, bottom green we see the total 10 deltas limit orders added / removed in the bid book. Top red, we see the total 10 delta limit orders added / removed to ask the book.

-
- In fact the left column gives us a dynamic photography that update in real time, which is the total of orders available for purchase and sale; therefore we see directly the proportions: it is a + y orders of buyers or sellers of orders. This column gives us the status of liquidity to book, apparently. That is what everyone sees in a notebook.

-
- While the right column for its part, gives us a dynamic picture of the process of additions and withdrawals limits orders book. This colone therefore illustrates the progress of a mechanism: the structural alteration of a book.

-
- If we look at the example of the power metter in screen above: we see what?

-
- We see that there is a book that is pretty seller (apparently)! For there in 1826 limit orders available to ask size of the book, limit orders for 1662 available to bid size of the book. So there are more orders sellers than buyers orders; therefore a lambda retail tradeur will say that the book is seller! This is what we want to see him.

-
- Except that in reality, when you look at the process of additions and withdrawals of limit orders in the right gauge, we see that the orders are mainly additions to the bid, and withdrawals of orders are mainly the ask. This means that the book is ask the spirit to weaken, in favor of a bid that is about to expand.

-
- The book is spirit to pass discrement buyer, while appearances to when they still saleswomen. Appearances can be deceptive in the order book, you know.

-
- The advantage with these two gauges of the liquidity measures is that you have a view of the book is twofold: you both what we want to see you, and what you present, in appearance; and you also have a view of what is happening in terms of additions and withdrawals of orders giving you an illustration of how the book forces are in the process of moving.

-
- The downside is that all this is displayed in real time at high speed, but does not print, and is not recorded in history on a graph or another.

→ The heatmap of Bookmap :
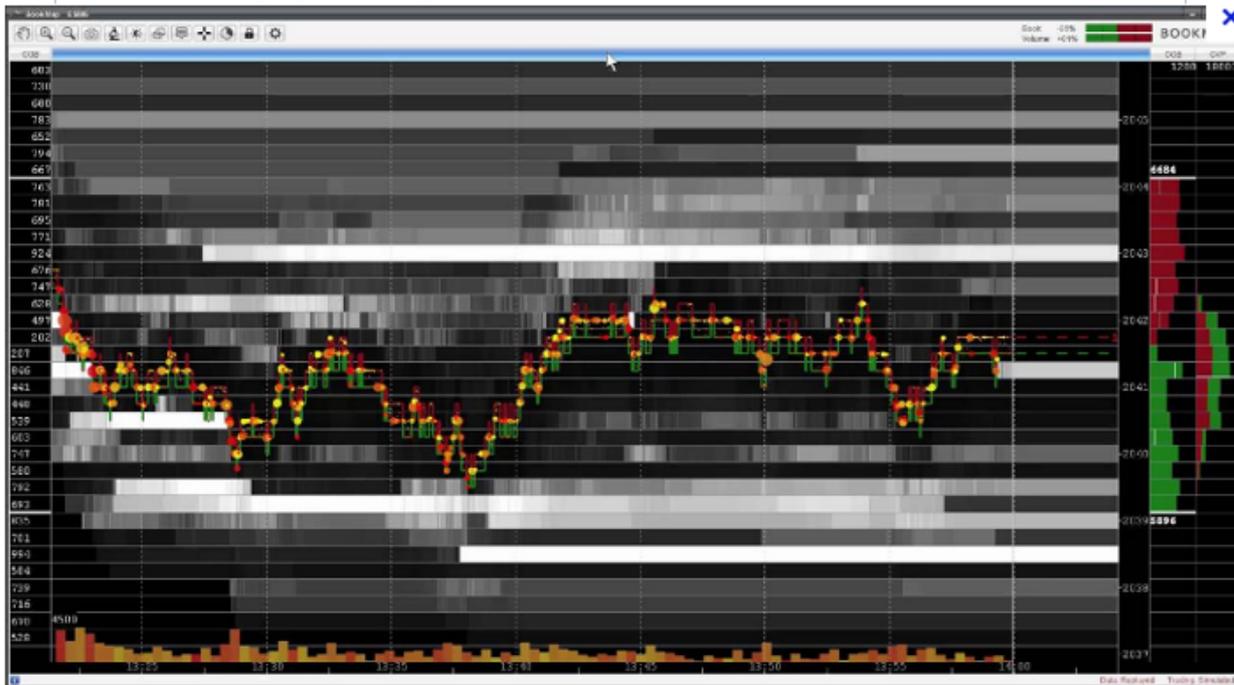
The Heatmap is a tool to visually represent the evolution of the liquidity available to the order book, price levels by price levels, with a set of black and white contrast, which shows how additions and liquidity withdrawals proceed.

•

• This tool is very useful to visualize the diverse and varied manipulations are performed in the order book.

•

• It also provides a basic representation of market volumes over time down the heat map.

•

• It allows to see at a glance what were the price zones that have been defended in the purchase and sale, and in which "order quantities".

•

• This map, however, has some limitations in reading the liquidity and its use: in fact, when large limit orders are flashed and removed in very short time spaces such as a 2000 order on the ES, added and removed 15 millisecond; bookmap tell a little white line, which will be invisible boundary to see, unless at maximum zoom, and more.

•

• Indeed, over a large limit orders will be added and removed quickly, the less it will be visible in bookmap, even in spite of its size, a significant ampleure.

•

• The creator and pioneer of the graphic representation of the order book is bookmap.

- Real Examples :
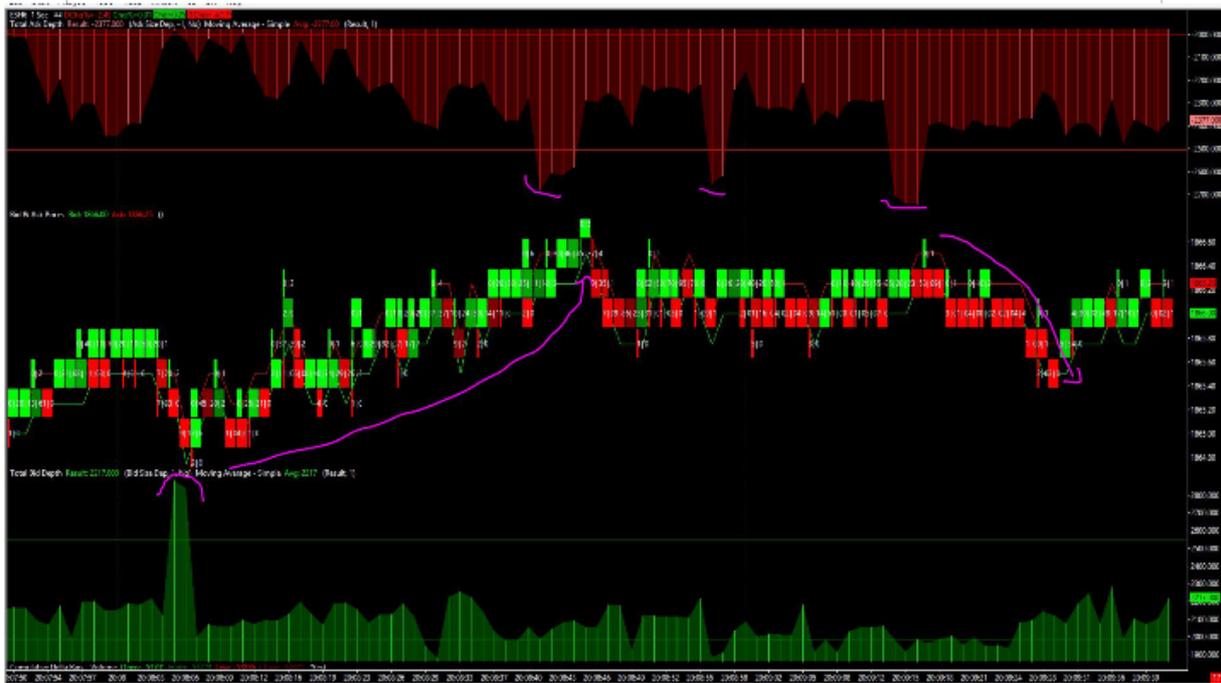
The QuantBook in version 4:

-

-

- In this example, we see quite how netellement liquidity available for purchase and sale to the book will precede the corresponding price movements. Low points and high points seem to be indicated by these spikes liquidity to the book. These liquidity spikes correspond to the book of orders amats limits to bid or ask the book.

-

- In reality, we realize that these liquidity additions to the book will come directly impact and influence the flow of market orders, which shall come (interested) or test this liquidity to enjoy or follow this liquidity hitting the even sense it.

-

- Once these intentions flow of market orders are revealed to light (the algo market making hft), then we will be able to measure what impact this flow of market orders on the price action.

- The extent of this impact will then illustrate a facet of the quality of execution of this market orders flow: + this market order flow will generate a significant price ranks during its execution, + we consider that the slippage in execution of this flow of market orders is important.
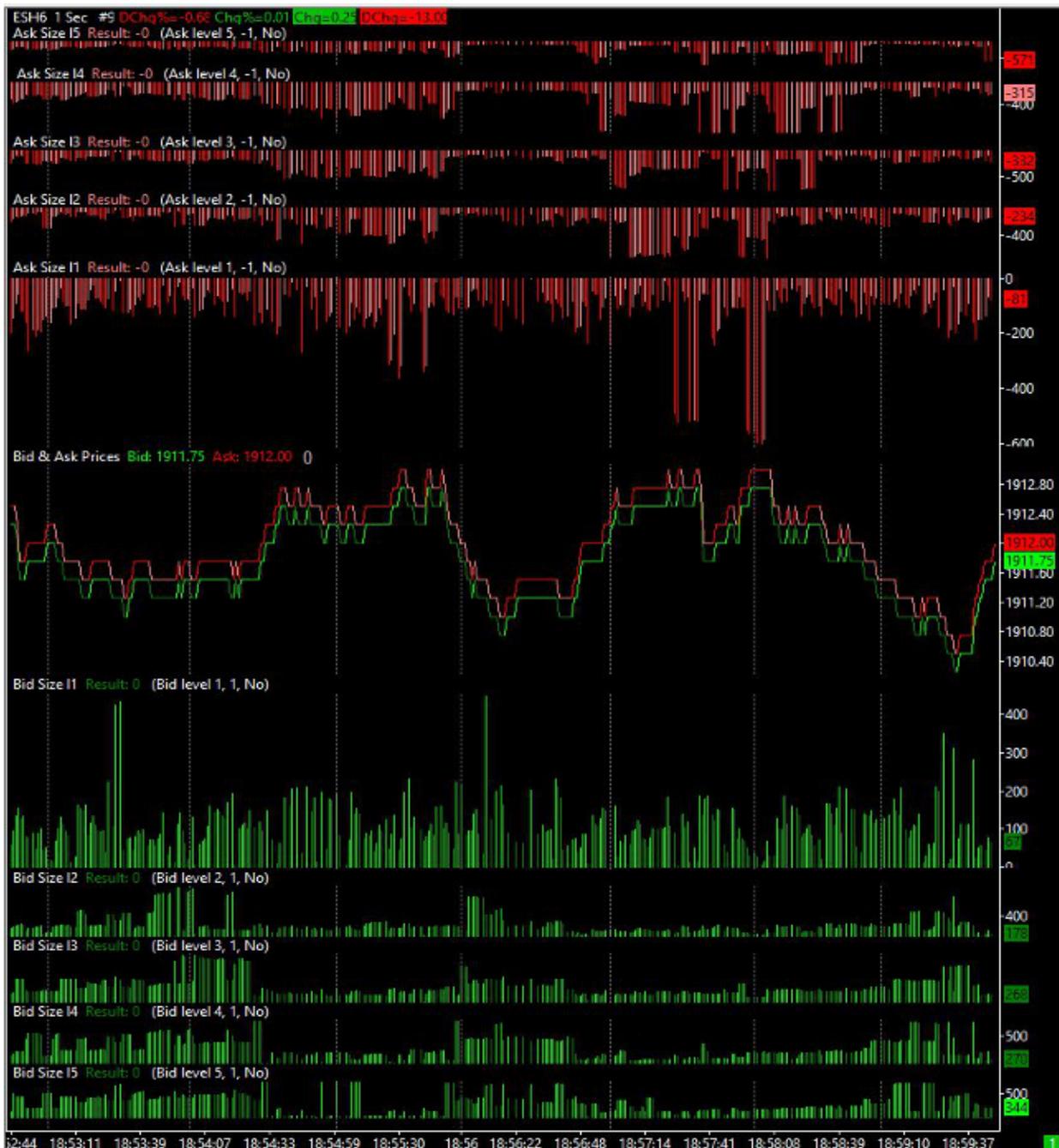
The QuantRun in version 4:

- in this example, we see again that the spikes liquidity to notes for purchase and sale, form the high points and low points of the action of the corresponding price.
- The level of 1912.75 / 1913 is resistance (tested at 3 recovery in the first phase of increase) then we see that comes retest that level again, and there are still more orders + limited to the sale as before . The resistance is still strong +.
- The price back down to the liquidity spikes to bid as a support.
- The price action moves in a fairly strong control.
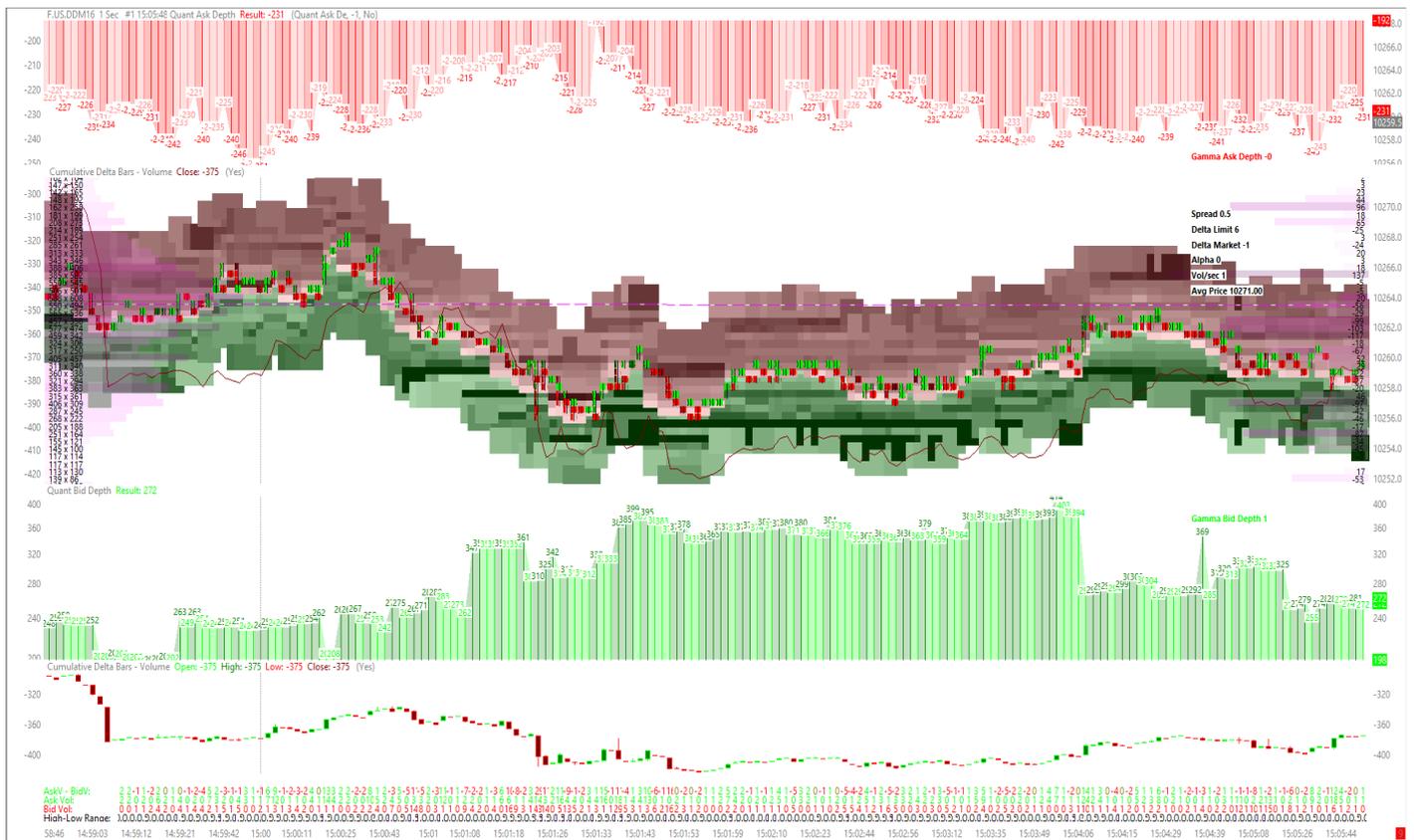
The QuantMap Version 5:

-

- As the Bid Depth shows increasing liquidity additions to bid when the price drops to this liquidity.

-

- The Map shows on which price levels, this liquidity bid focuses thereby see where that supports the bid stand in relation to the price.

-

- The inventory also delves into the decline of the price action, showing that it is made credible by the market volume seller that has a majority.

-

- All sellers market volume is used, and aglutinne of Ascending to the bottom of this price descent; while the bid depth continues to remain inflated stably despite the liquidity consumption of seller market orders.

-

- The price then rebounded as the market volume seller falls below the liquidity available in the bid book. Ask the volume market than what is available to ask depth of book, then the price rises to the biggest limit available for sale.

5) Quant :

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• **subject:**

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• As the graph is a tool available liquidity of a market order book (via limit orders), and its market orders flow (via market orders), moving relative to the price and the passage of time; and visible within one and the same system: a single chart: Quant. All these graphics data are measurable and extractable from a quantitative point of view.

•

• **Representation :**
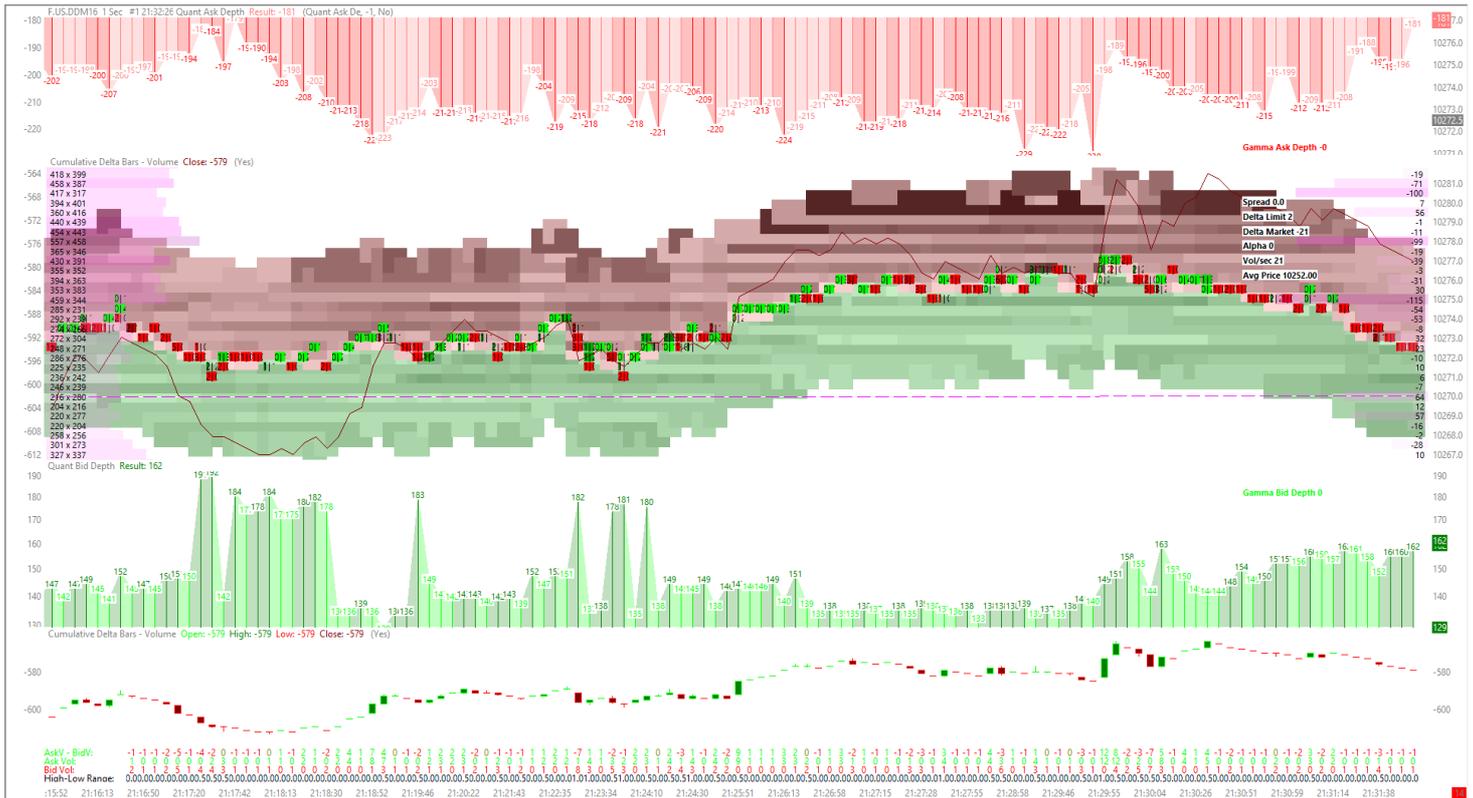
As functions:

•

• Firstly we can see that the respect is made up of 5 distinct regions.

•

• The green shows the purchasing activities (limit or market)

•

• The red shows the saleswomen activities (limit or market)

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• the time unit is in seconds.

•

• the refresh rate is millisecond.

•

• the printing of certain statistics is below the millisecond.

•

• A battery of numerical statistics on the right side to fill space.

→ the middle of the Quant :
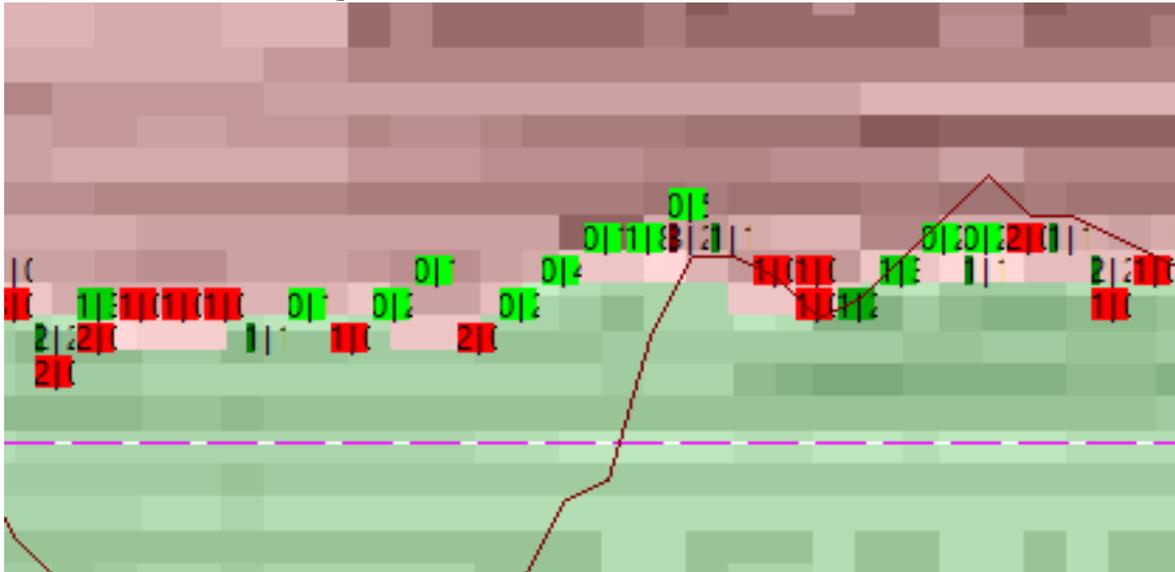
As in this part of the middle of the chart, you will see changes in the price (price action) move with respect to time.

- You can also view the inside of the bars in order to measure volumes traded in the market: market orders to buy (Ask Volume) and sale (Bid Volume)
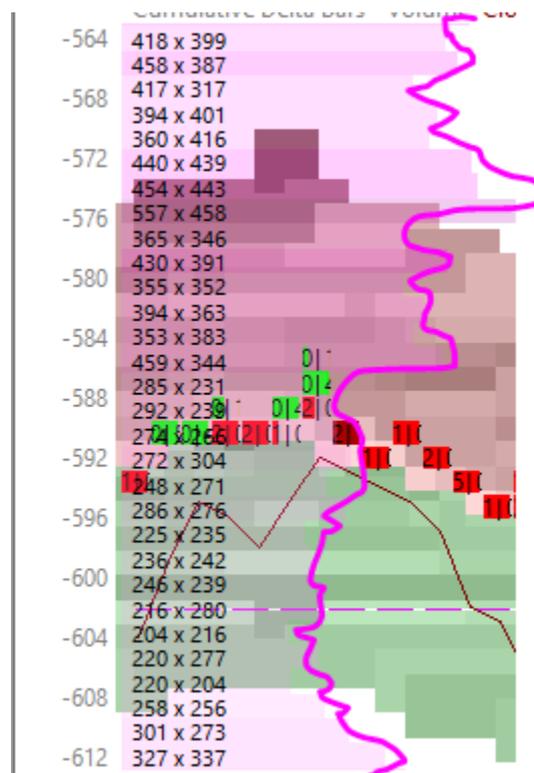
The profile volume which is a graphical representation of the market trading volume compared to the price on the day

- Colored pink in the dark + + clear, depending on the volume size; + The volume will be high in price level, and the horizontal bar + profile volume will be long and dark colored pink.
- The total market orders quantities traded by price levels are shown on the left.
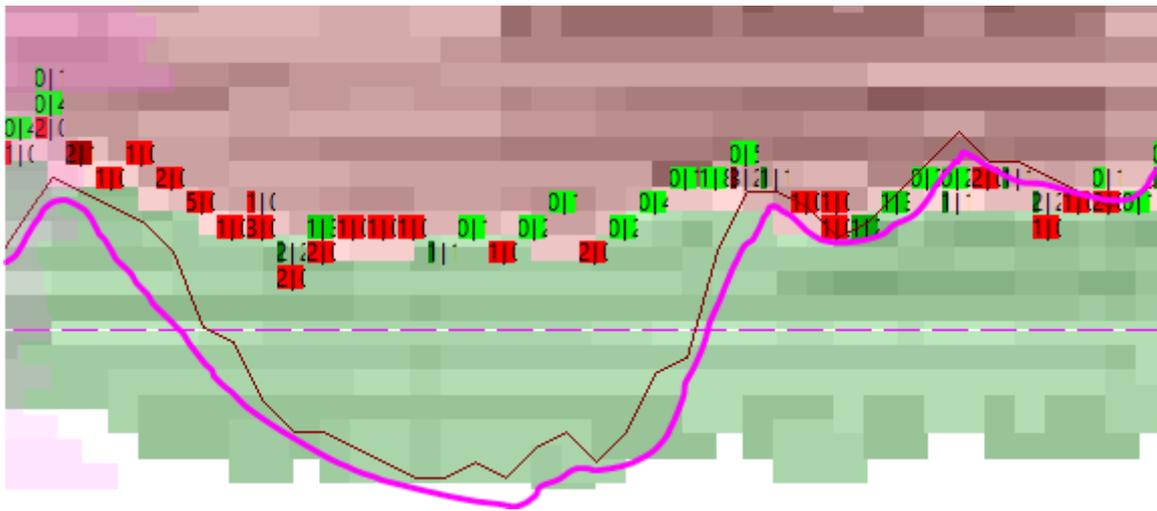
The inventory is dark red overlayé directly on the chart of the price action
- is shown in dark red and increases and decreases represent the change in the inventory of market maker
- When he crosses the prices down, it is assumed that this is pretty bullish.
- When he crosses the rising prices, it is assumed that this is pretty bearish.
- We will look for differences between the inventory and price.
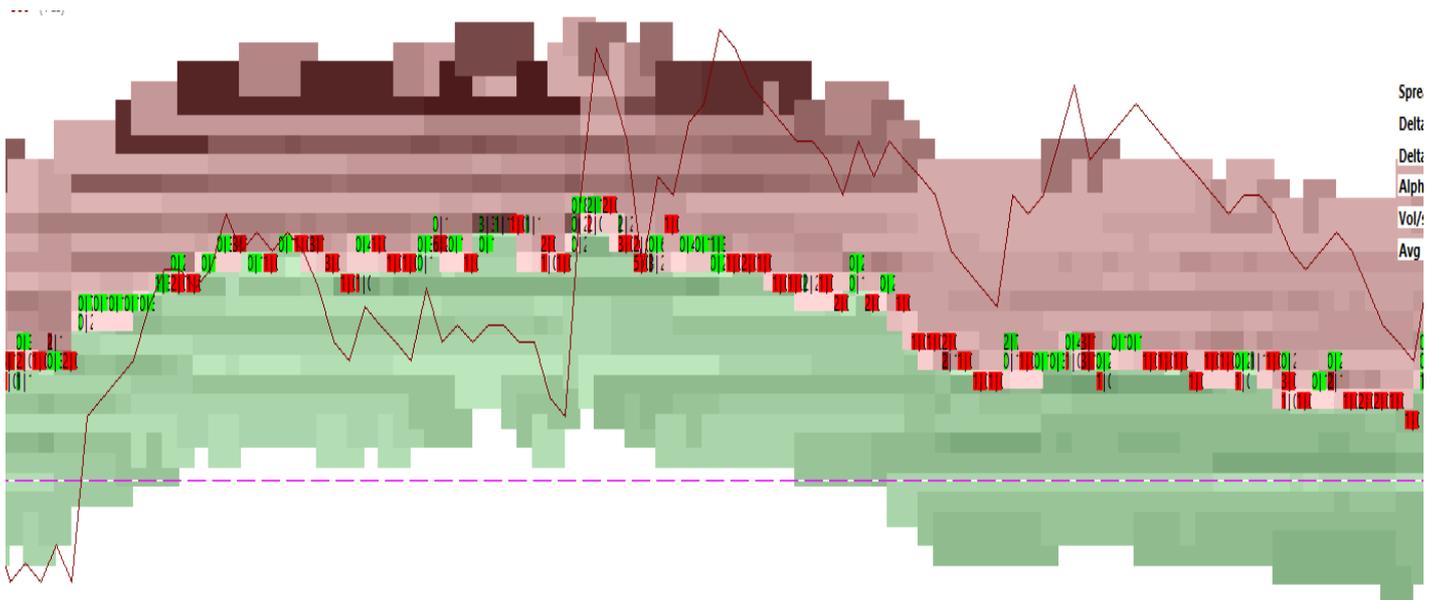
The Map, directly asked about the price, will allow to see how focused the available liquidity of the book for each level depth.
- This map will indicate large quantities of orders salespeople limits when there is dark red, and large quantities of buyers limit orders when there are dark green.
- At most couleure of the map will be clear, and there will be less liquidity available in order to limit term in the book.
- This Map will also allow us to visualize the process of additions and withdrawals of orders limits the book.

Delta	Price
-32	10259.0
-32	
-18	10258.0
43	
-70	10257.0
-87	
-63	10256.0
-21	
-138	10255.0
-23	
-36	10254.0
-21	
-6	10253.0
8	
-83	10252.0
-30	
-66	10251.0
-20	
25	10250.0
-6	
-29	10249.0
-39	
-24	10248.0
-39	
-17	10247.0
-10	
-7	10246.0
-9	
-10	10245.0
-5	
4	10244.0
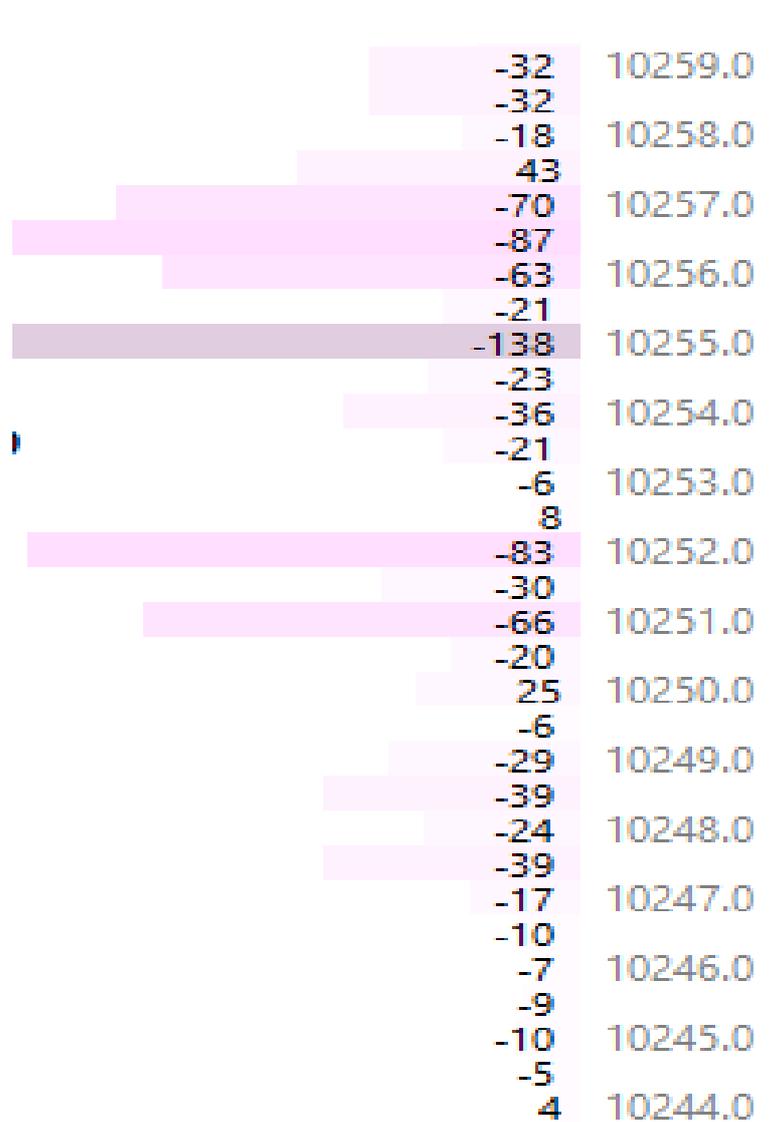
On the right side of the As you can see the "profile delta" of the current day; it's like a volume profile, except that delta profile will be calculated on the delta volume market, not from markets volumes.

This delta profile is a profile that will represent different market volume delta on each of the price levels of the day that were printed.

This profile delta will see areas with high volume market delta, and delta areas of low volume markets with peak and trough profile.

Areas with high market volume delta (delta peak profile) will correspondrent to significant areas of removals from the MM to notes.

Areas with low market volume delta (delta hollow profile) will correspondrent to market making leakage areas.

The quantities, if they are negative will indicate absorption advantage for sale.

The quantities, when positive, will give advantage leakage purchase.

As in the volume profile, the profile delta will be colored pink, with a play of color from light to dark. More it is darker, the delta volume is large (positive or negative)

Gamma Ask Depth -1

Spread 1.0
Delta Limit 4
Delta Market 1
Alpha 0
Vol/sec 1
Avg Price 10269.50

Gamma Bid Depth 1
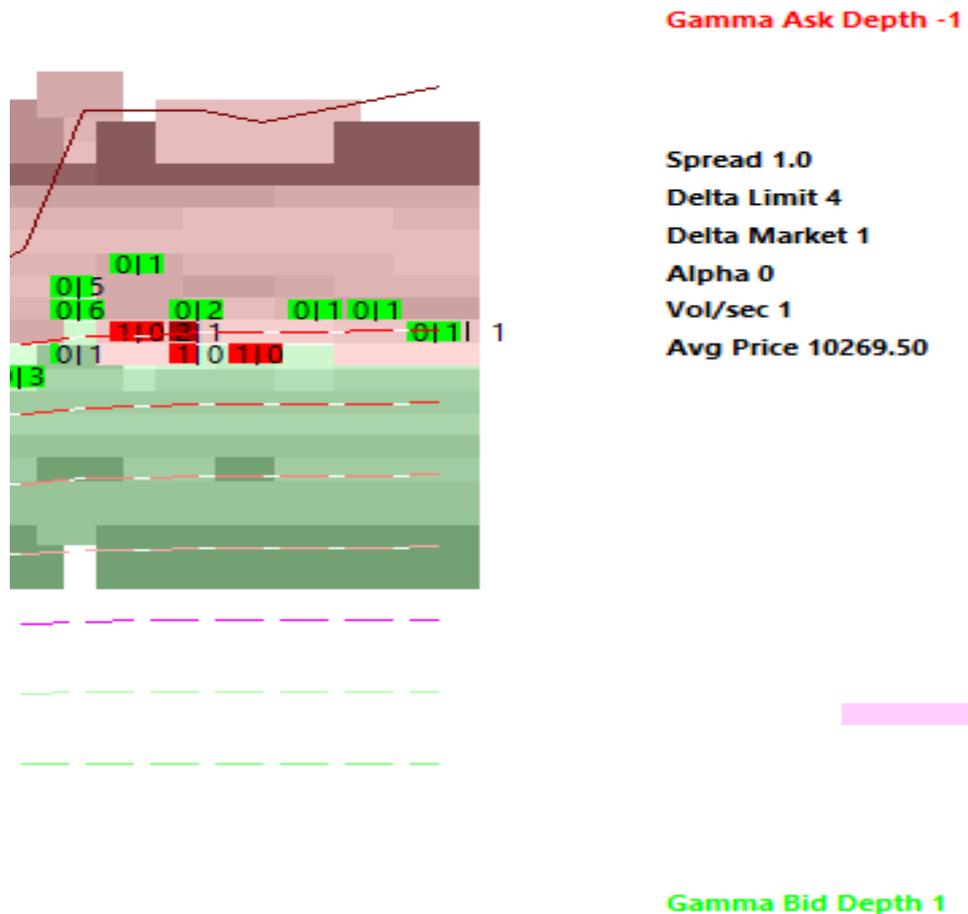
VWAP bands in red and green corresponding to the weighted average price per volume market.
Purple one finds the "central" VWAP: the average price: fair value from markets volumes.
Red, there are the standard deviations of the VWAP as a strength: the areas where the price is considered too expensive.
Green there are the standard deviations of the VWAP as a medium: the areas where the price is considered to be fairly cheap.
Among the statistics on the right side in the fill space, we will find the spread of the book, ie the difference in tick of the trading range of the book (Ask Price - Bid Price)
Delta Limit will be the total depth ask bid less total depth: that is, the difference (delta) between the selling of book liquidity, and the purchasing of book liquidity (for the top 10 levels of depths to ask and bid)
Delta Market will be the difference between the buyer and sellers market volumes
Alpha is the degree of absorption: it corresponds to the delta volume market divided by the ranks of the bar.
Flight / sec is the rate of flow of market orders: the number of contracts market in the second.
The Avg Price is the weighted average price of the bar by the market volume of this bar.
Gamma delta is the Depth of the variation in sensitivity to the passage of time. It shows the evolution of liquidity over time in relative terms.

The footprint of the book limit orders within the map:

Inside the colorful map for each depth levels of the book, one can see the evolution of amounts of limit orders relative to the passage of time and at a price that moves.
+ In these amounts are significant in terms of size, and + the box of the map will be dark.
+ At these quantities are small in terms of size, and + the box of the map will be clear.
Above the price, the map with red boxes indicate the limit orders to sell, present at the ask order book: in shades of red.
Below the price, the map with green boxes indicate limit orders to buy, bid present order book: in shades of green.
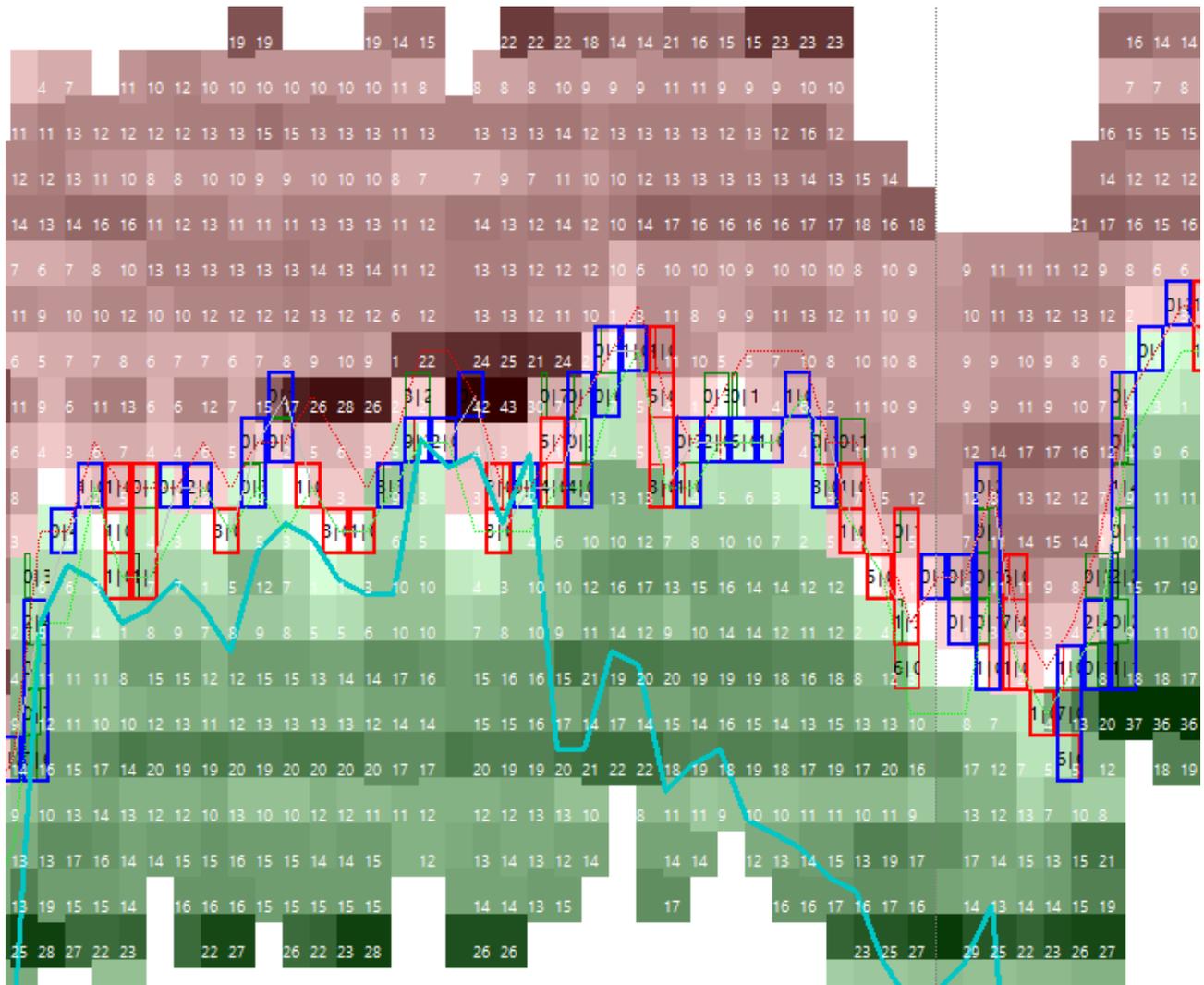
This representation is actually a real footprint of the book of limit orders will allow to accurately measure the evolution of orders on each limit price levels (in terms of quantity), but also the movement of limit orders within the depth book (+ or - close to the price).
The amounts of limit orders in the footprint of the map are white; not to be confused with the quantities of market orders, which are also in the map, but in black, inside rectangular price bars, blue, and red.

The light blue line on the map represents the inventory of market making overlayé on the price: Accumulated (ASKV-BIDV) / price. From a market making perspective, when inventory falls below the price it is rather bullish: when it goes above the price it is rather bearish.

4) Reading and Configurations:

Looking at the QuantMap evolve As time passes, you will notice that recurring liquidity configurations + or - different, with different variations, will be established, all day, all the time, and generally produce same effects in terms of price action.

Action of the order book, and then reacting the flow of orders and finally measuring the impact of that volume on market price action. Here the thread to read to measure the aggressiveness of both camps (limit / market) in terms of actions / reactions. It is this thread chronological driver that will allow the detection of specific behaviors.

The flow of orders and market confronts consumes the order flow limits available to book: and each of these two orders flow will interact together to form the price movements via various execution process of these markets orders.

Example 1 :
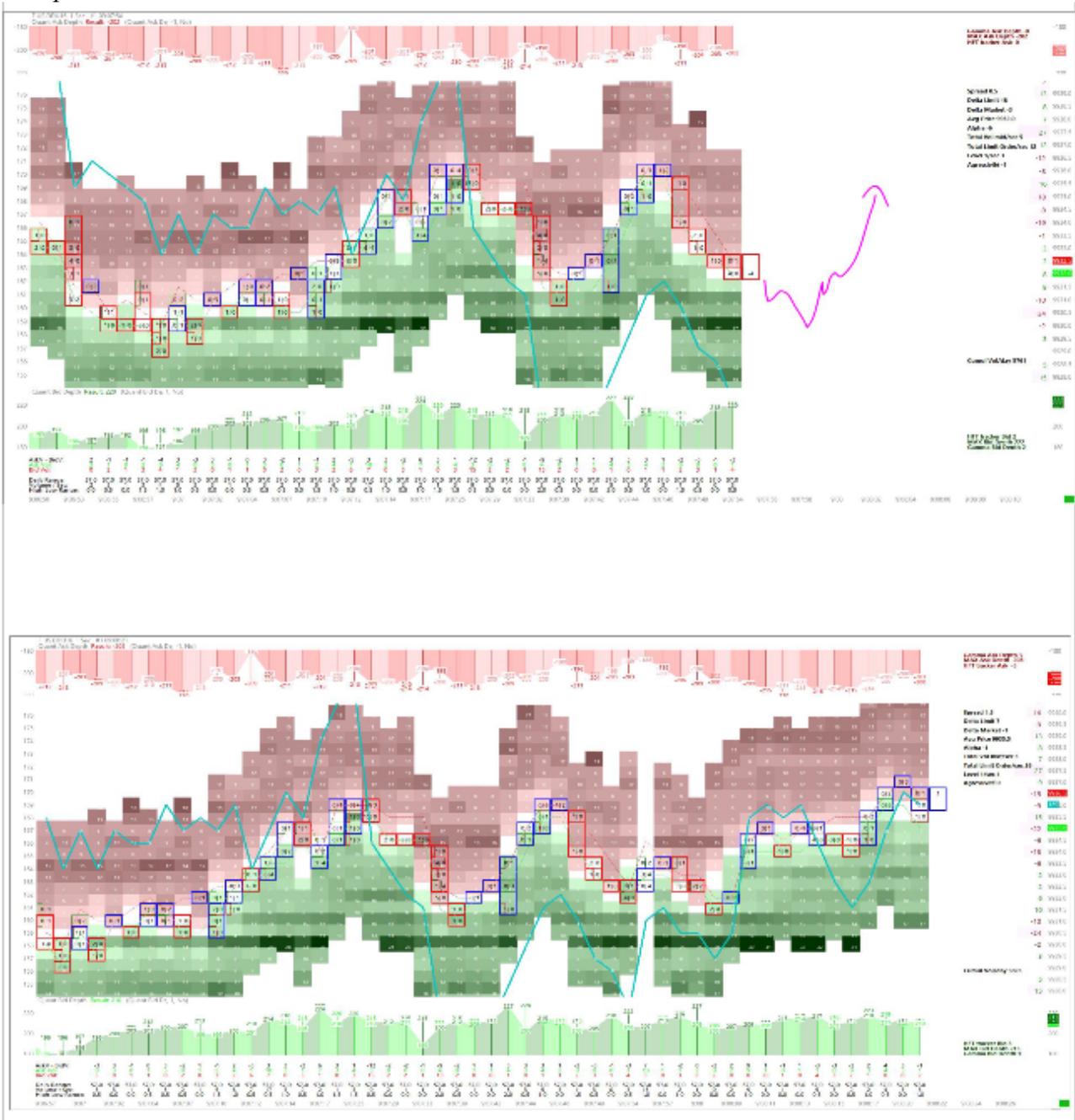
In this example we see that the price has just gone up, then it starts to make a range with a bid to notes that inflates on a deep level.

Nothing in particular to ask the same time, and market volumes that become sellers, with an inventory that goes under the price.

The price is close to the big limit to the bid book, but it remains in place and is growing in terms of size.

This is a rather bullish setup.

Example 2:
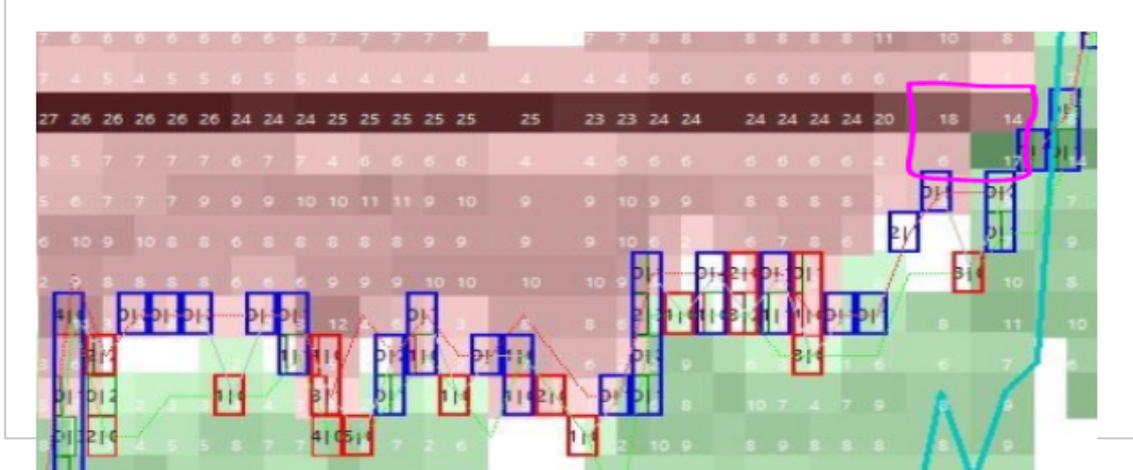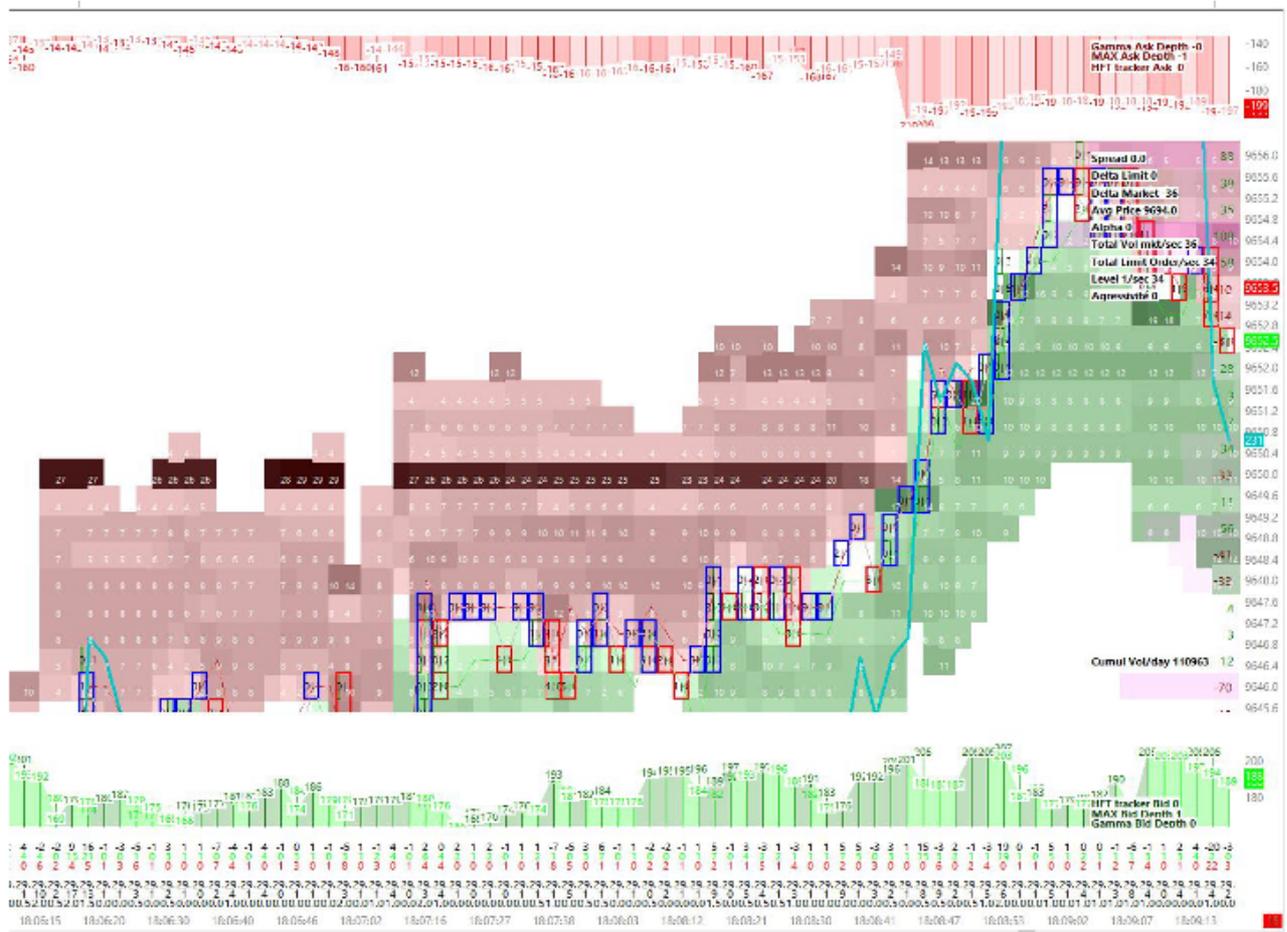
In this new example, we see an opportunity to work a buyer break of visible resistance to notes, consisting of approximately 25 contracts.

Indeed when the price approaches this resistance to ask the book, materialized by the dark red band

is evident that the amount available in this price levels to ask decreases from 27 to 20, then 18 . The two best ask the book then retires and is replaced by 17 limit orders that fit aggressively buyer directly to Level 1 of the bid book! It remains more than 14 available at the best ask in front of the 27 to start. The trap closes on sellers in position ...

This illustrates a door that is about to open, and the price will blow this door, riding easily, because the conditions to notes are made to the price goes up: removal of ask and bid on adding flow from the bottom of orders buyer markets. positions vendors will be stopped, which will fuel the rebound. That is to say that "at that time", "everyone" (MM and market) will want the price goes up. Be careful not to fade it for sale, not to take the champagne cork in the eye with slippage.
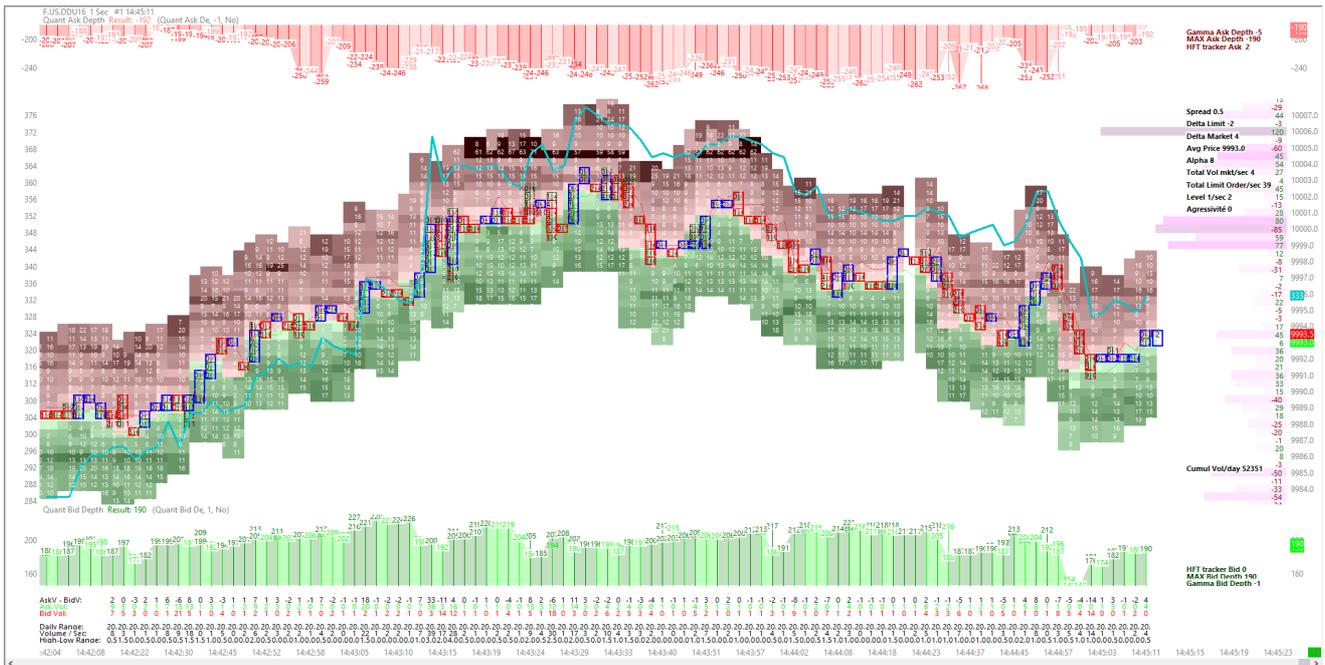
Example 3:

In this example we see a big barrier that appears to ask in the map at level 9 and 10 with more than 60 vendors limit orders available to book.

The price is approaching the order, 5 tick, without touching it, and about 60 remain in place
The prize went inside, and ask still holds more for more pressurize the prices down, while the bid side of the notebook slightly evaporates.

The price then retest comes close to the resistance area for a top M; around 60 to ask is always present, in chilling fashion.

Minutes later, the price retraces all he had earned on the rise.
You can work in this setup logic with bland stop just above the deterrent order.

Example on QuantMap V6 and V7 :

17H39.21/23 CET on FDAX [33/28/21] bid order available who becomes [8/12/20] then [8/9/7] filled for real
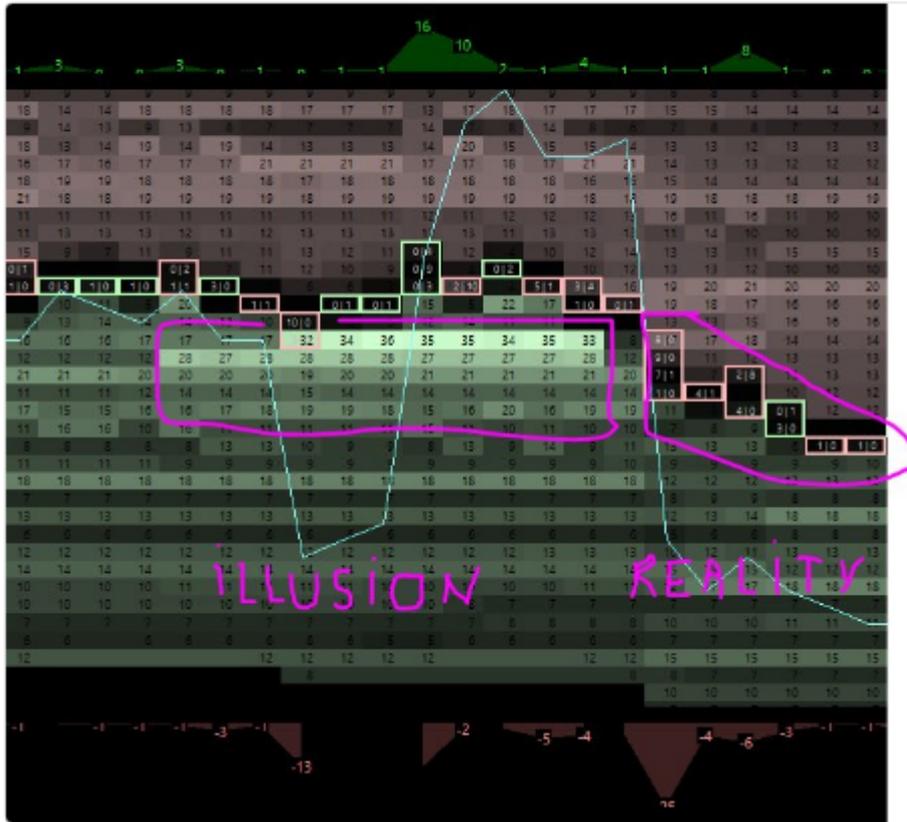
FDAX : go back to 10 700 with a 50 & 30 bid depth limit available on 93/94
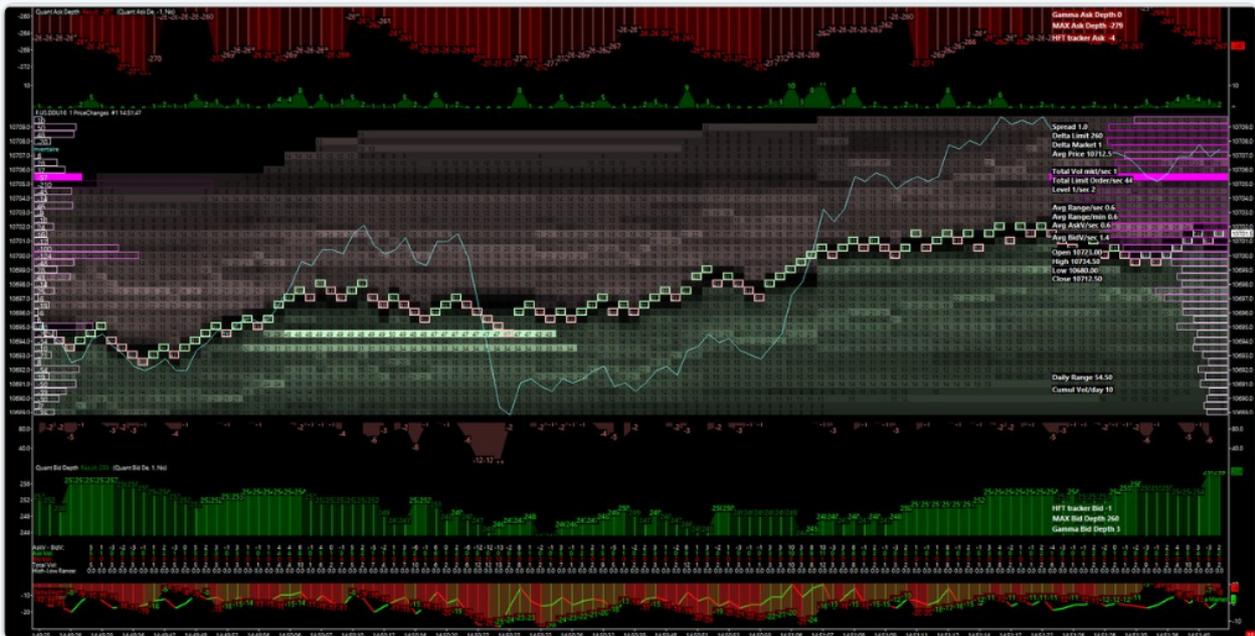
–
– *other examples :*

GC : frightened liquidity trying to be filled by buying the top of the day ? LOL

GC : adding liquidity to the ask side for preventing the price from going higher..#rigged #market #making
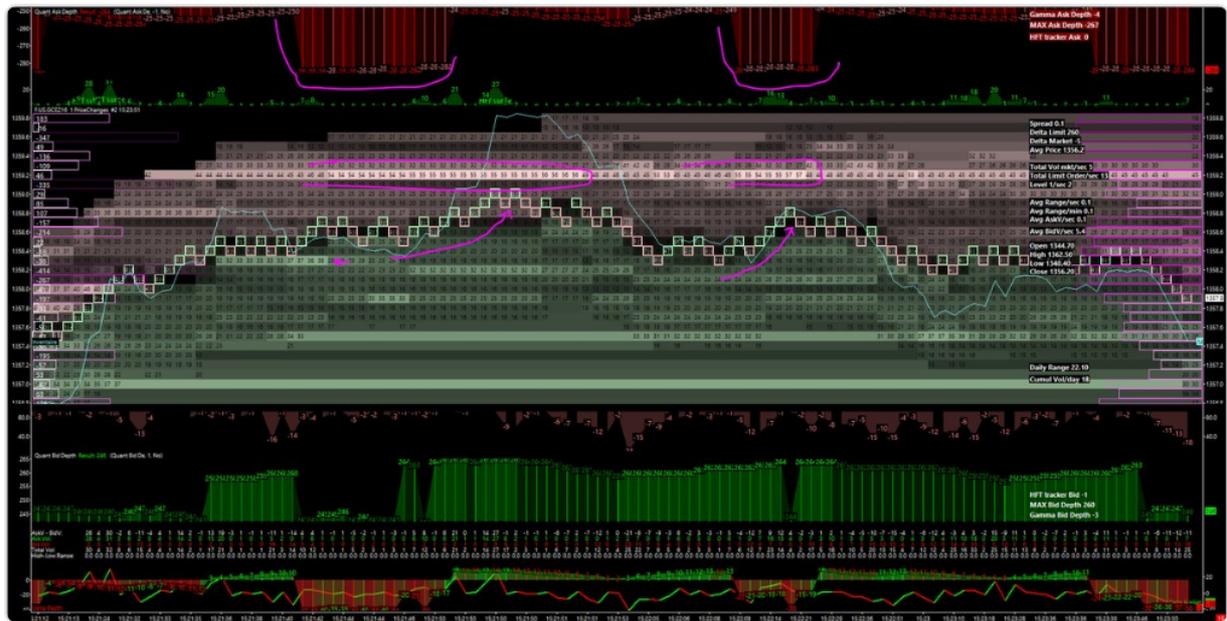
Example 5 :

GC : building bull trap near to the top of the day GC

–
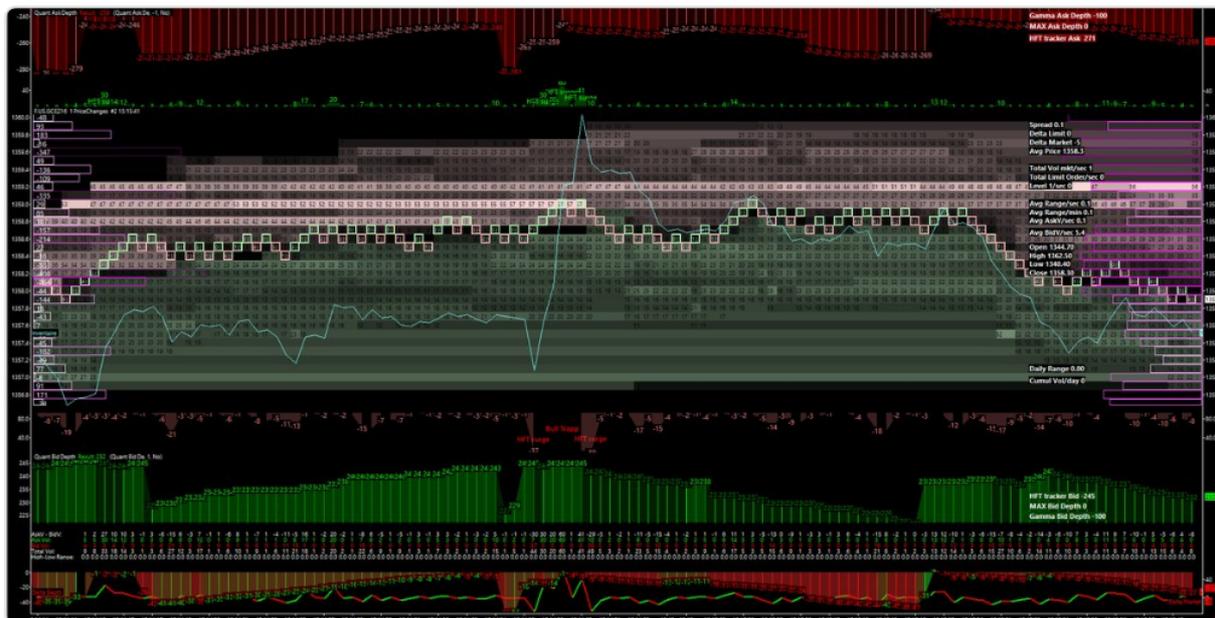
[14H36.09/10] CET : 2 seconds of foolish activities (GC)
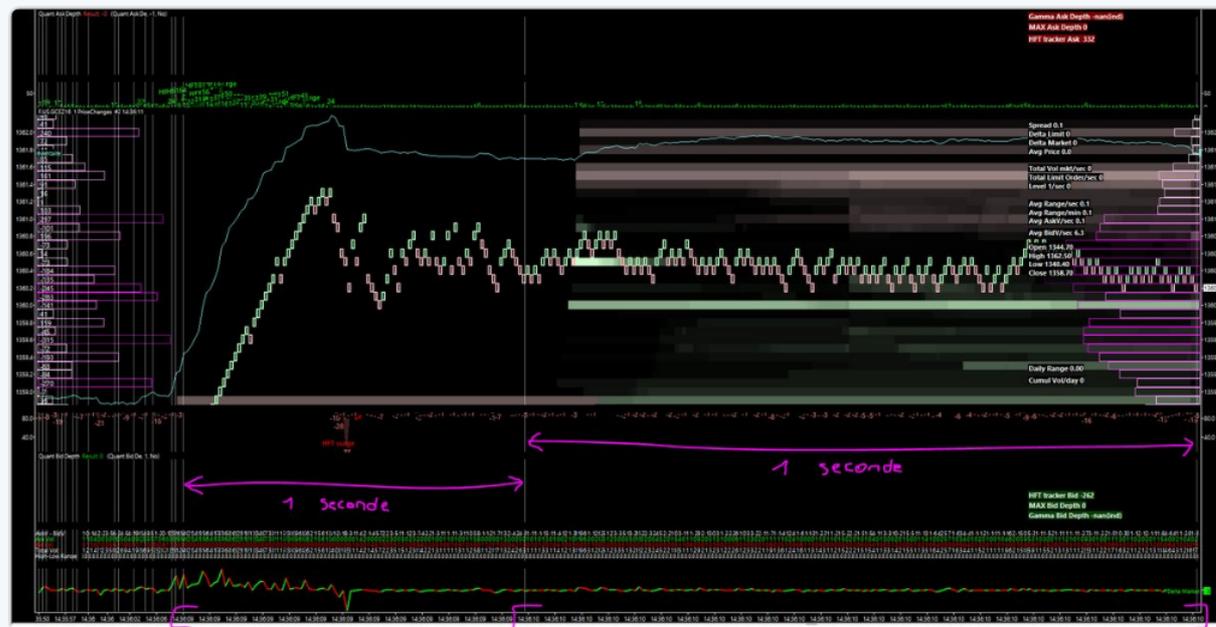
Example 6 :

GC : when HFT buy surge on a big ask depth limit area... #reverse #QuantMap #HFT

GC happyness during the retails sales : 1063 bought contract traded in a second... 66 tick cleared! #HFT #QuantMap

Example 7 :

FDAX moove during the retails sales :
[14H30 CET] 160 sold contract for 31 tick
cleared, less of a second #QuantMap
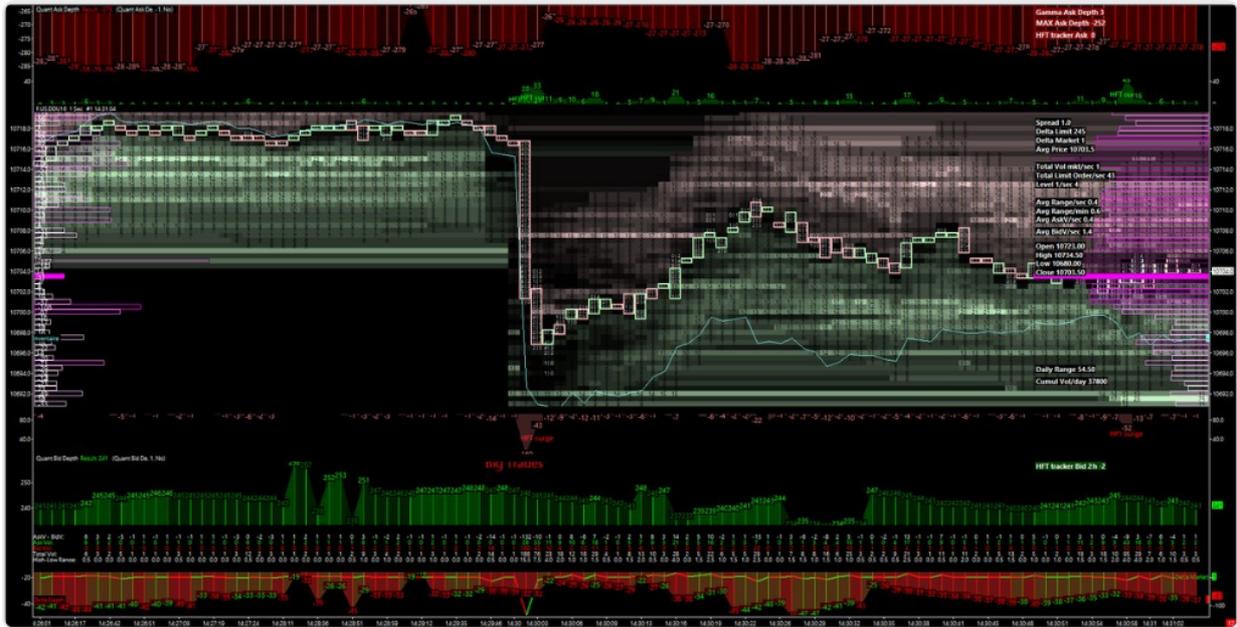
FDAX : 6 throwback on this orderbook
support (10 700) during 10min before
flying to the high.. #QuantMap
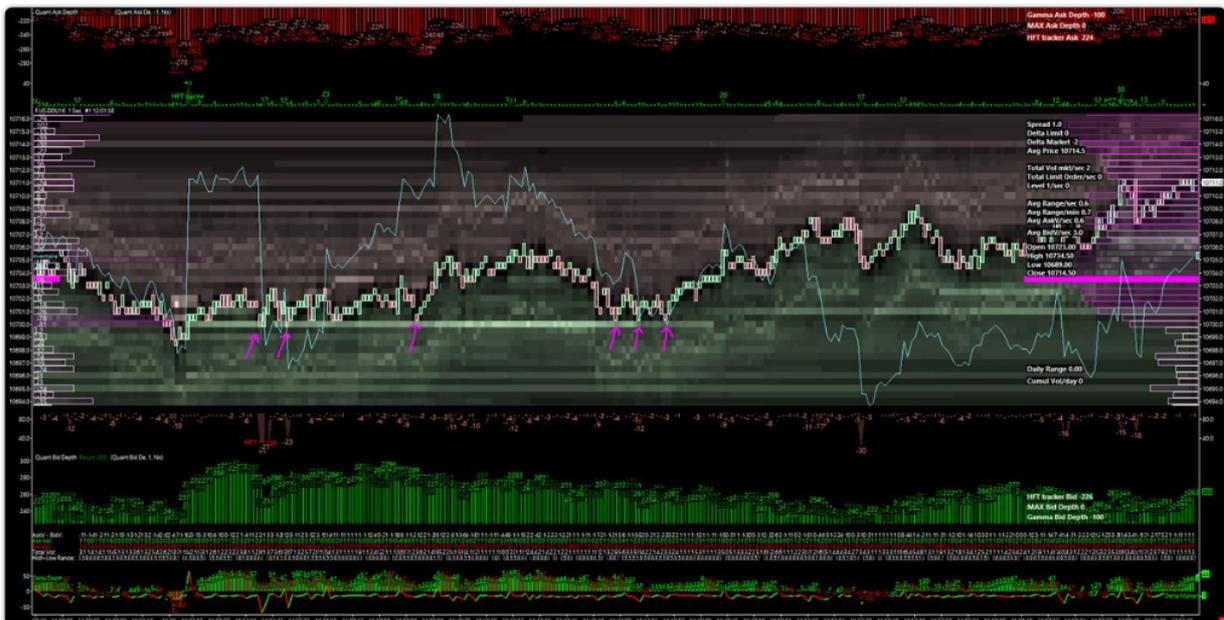
Example 8 :

FDAX : 110 contract bought immediatly : 9 tick cleared in a second at [15H03.32 CET] 102 bid order added just before

–

FDAX : liquidity hole during the jobless claims : [14H30.00]
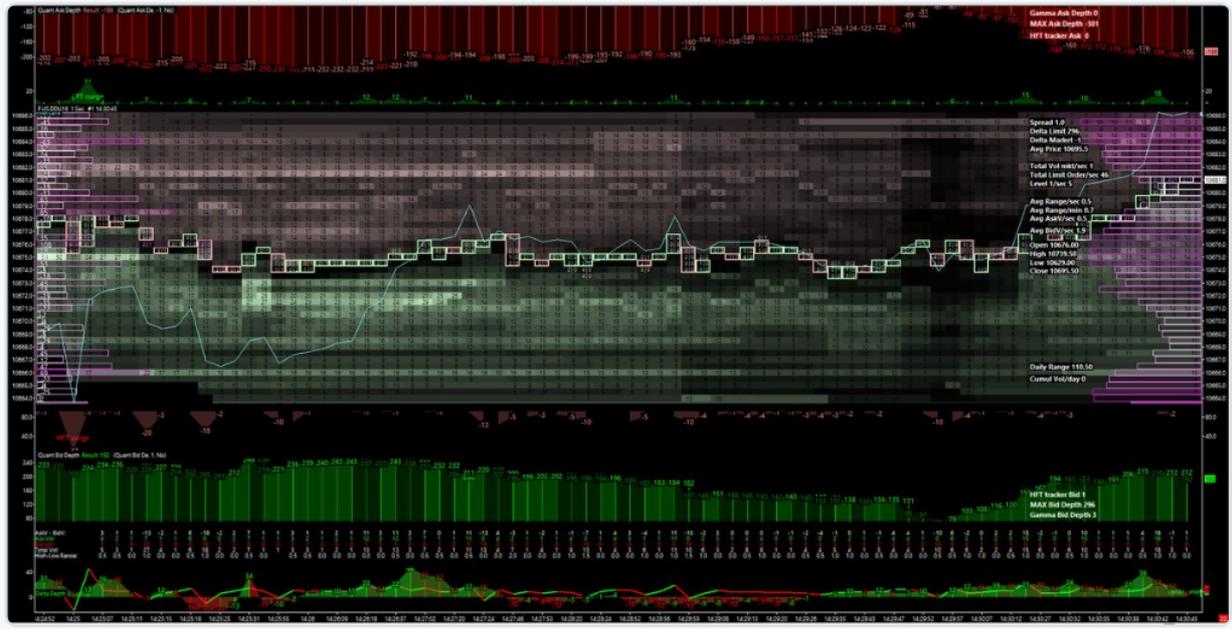
Examples 9 :

FDAX : HFT buy surge on a big ask depth limit on 10 675 at 14H11 CET ..
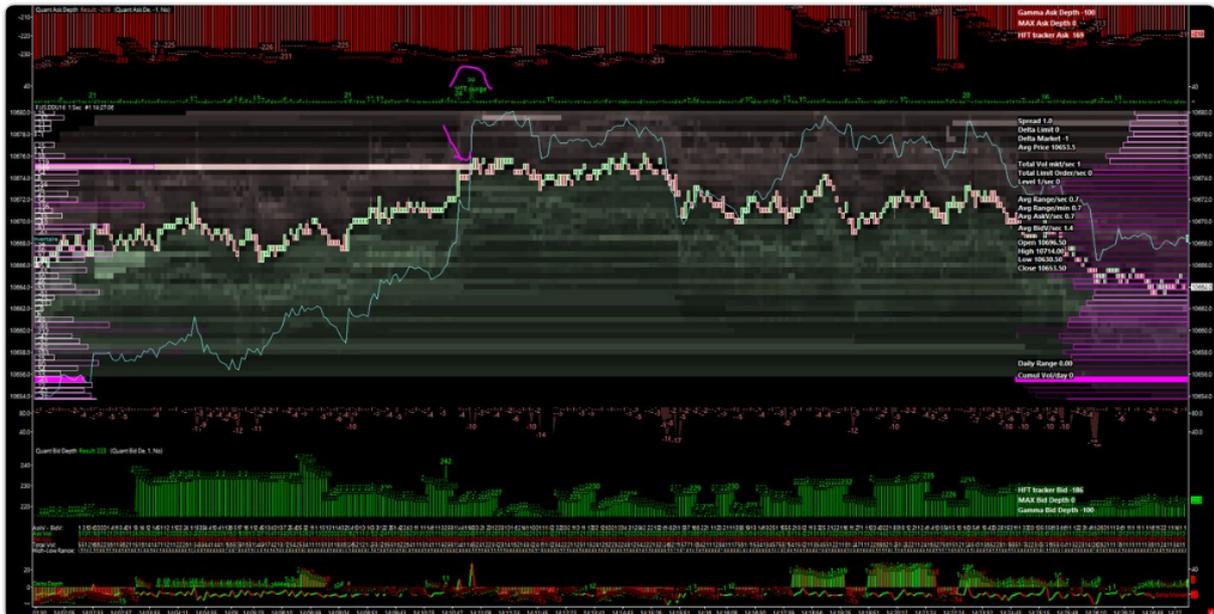
FDAX : bullish setup on 10 652 [17H40.30] CET ; big market volume are on sell side.. so price goes up.. #QuantMap
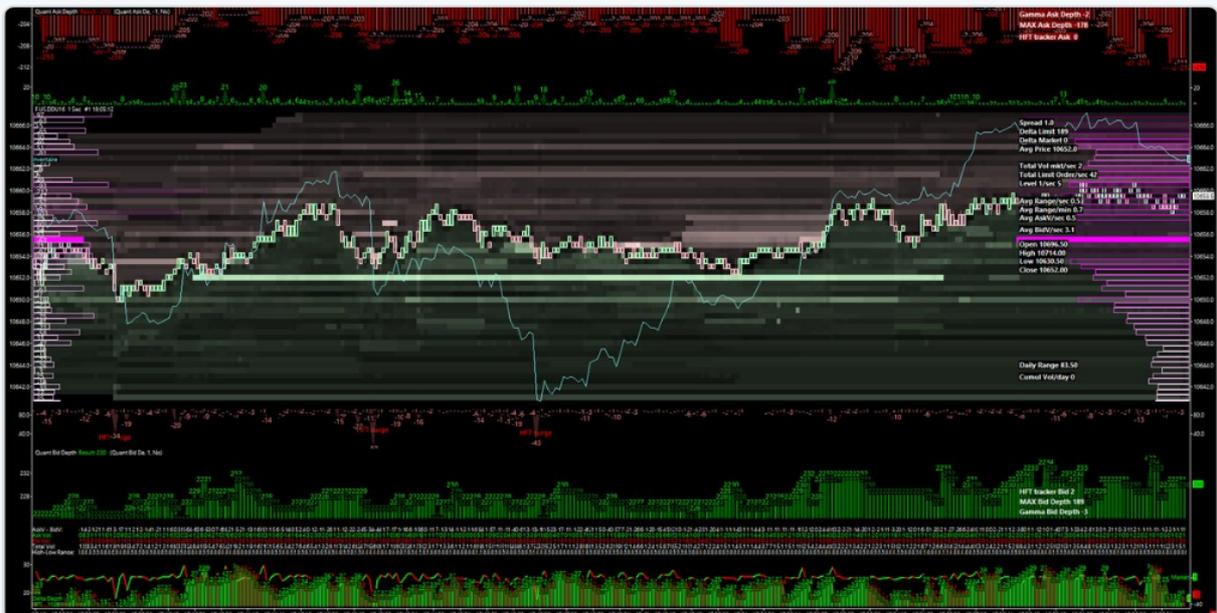
Example 10 :

GC : on 1359.7$ during US session
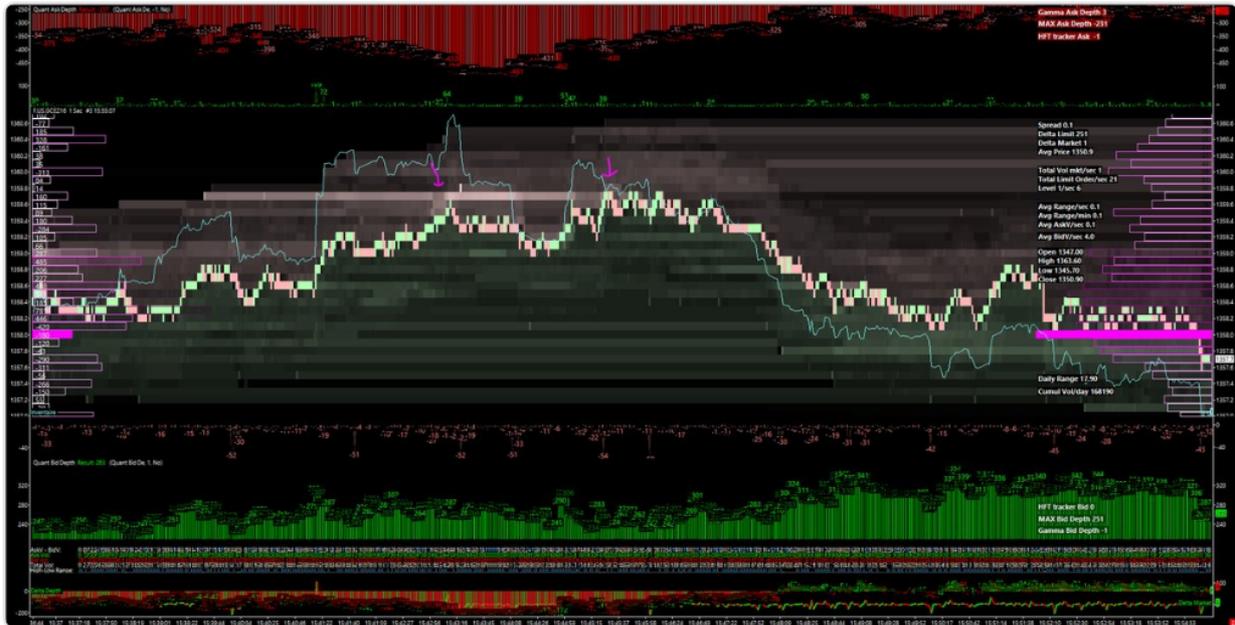
FDAX : bear trapp on HFT sell surging with big trades just before [11H55.25] #QuantMap #Version7
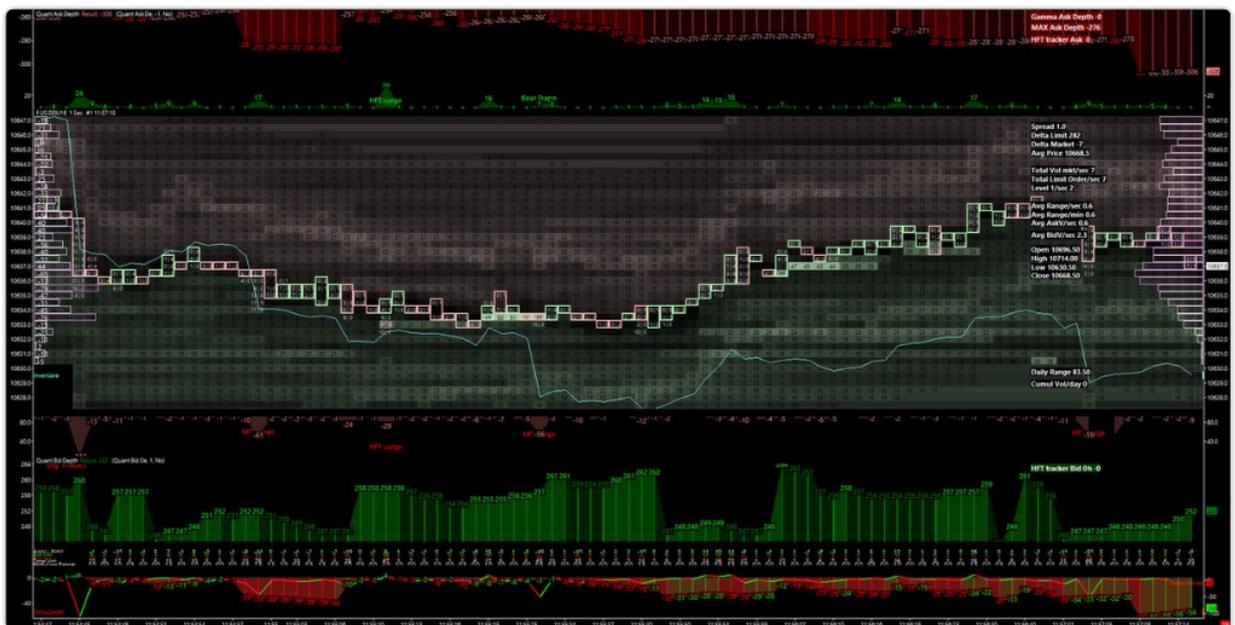
CL : bullish depth structure on 43.00$ [17H29.34 CET]
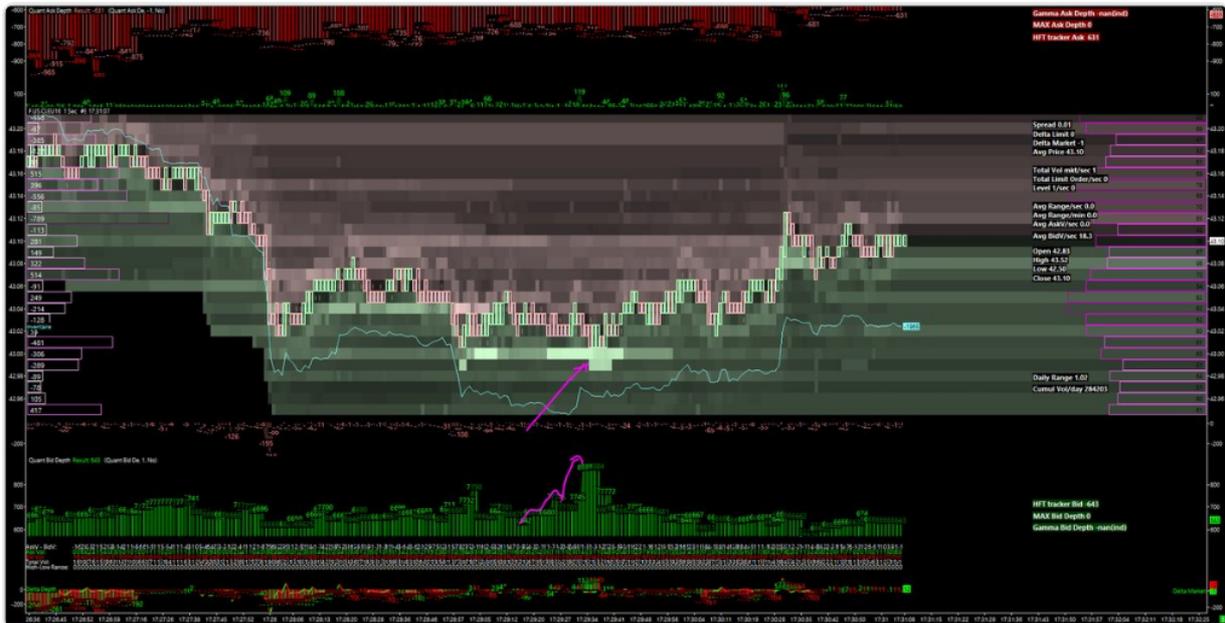
2k es cts sold at 2182 [16H49.08] for only 709 orders available at the best bid. No price impact. #iceberg
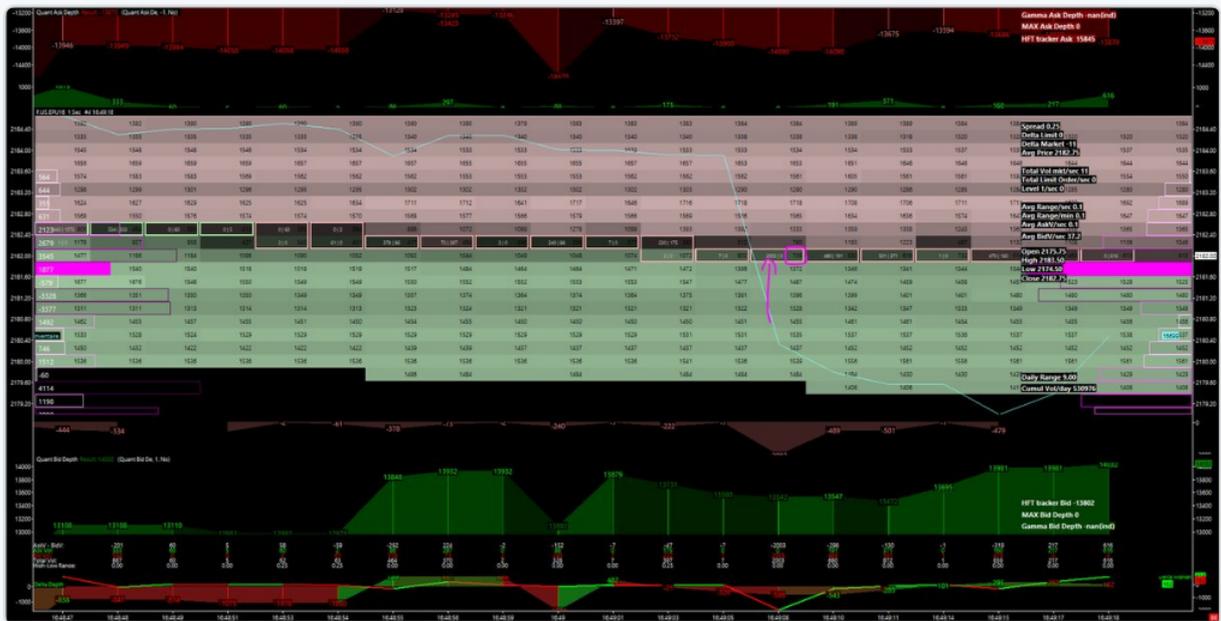
NQ : market sell locked on this bottom .... beautifully trapped on 4790/91

–
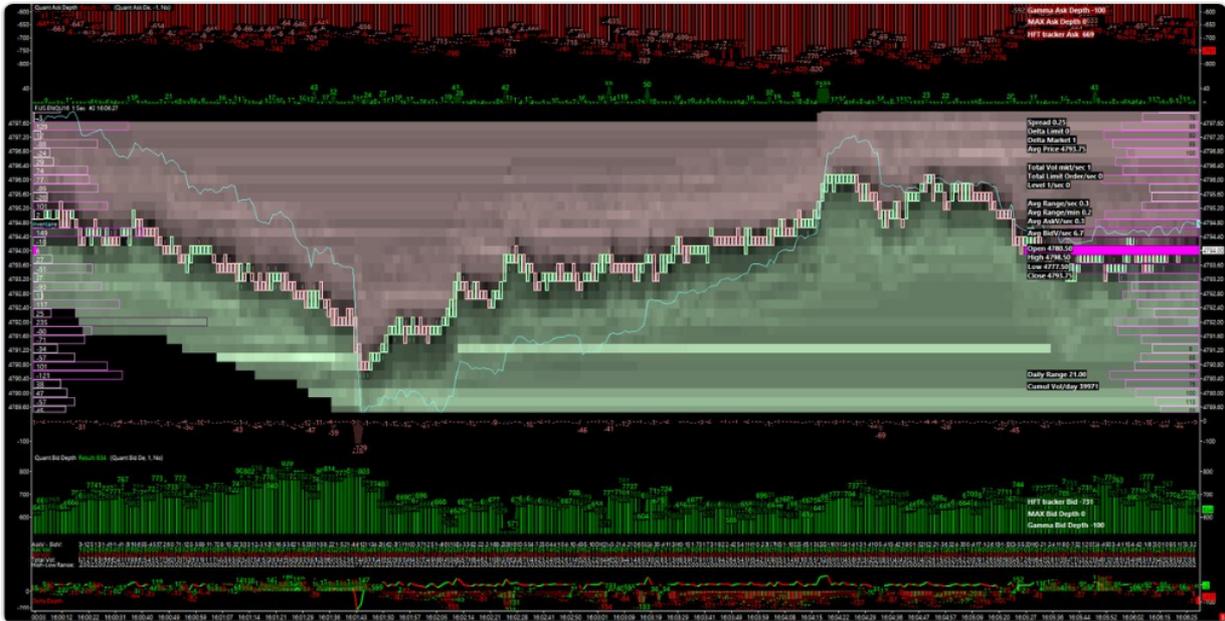
FDAX : the famous 40 limit order on the ask depth ... making price rejection on 10 473... stop above #QuantMap
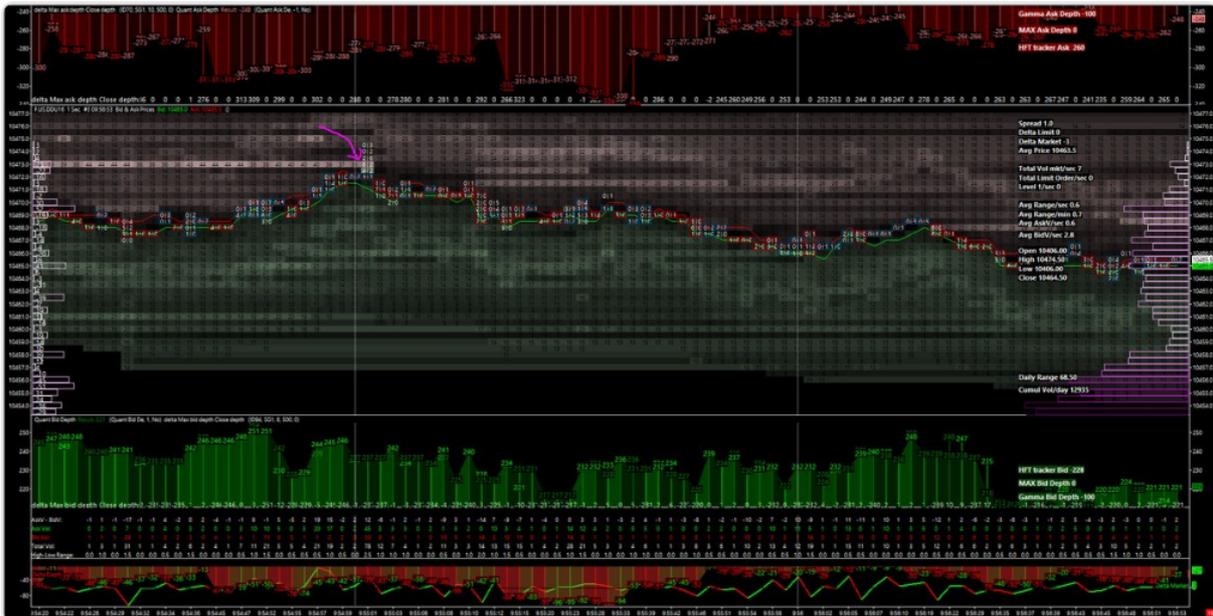
## FDAX 9H15.13 CET : spoofing activities with 62/70/86 available on the askdepth ; pulled, and added higher

–

64/73 bid limit order on one level of the depth pushing the price up

Other examples :

FDAX : orderbook support #QuantMap #Version7

–

GC : 10H25.48 : spoofing on the ask depth
on 2 levels with 164 and 95 orders
available for 4 seconds, and disappears
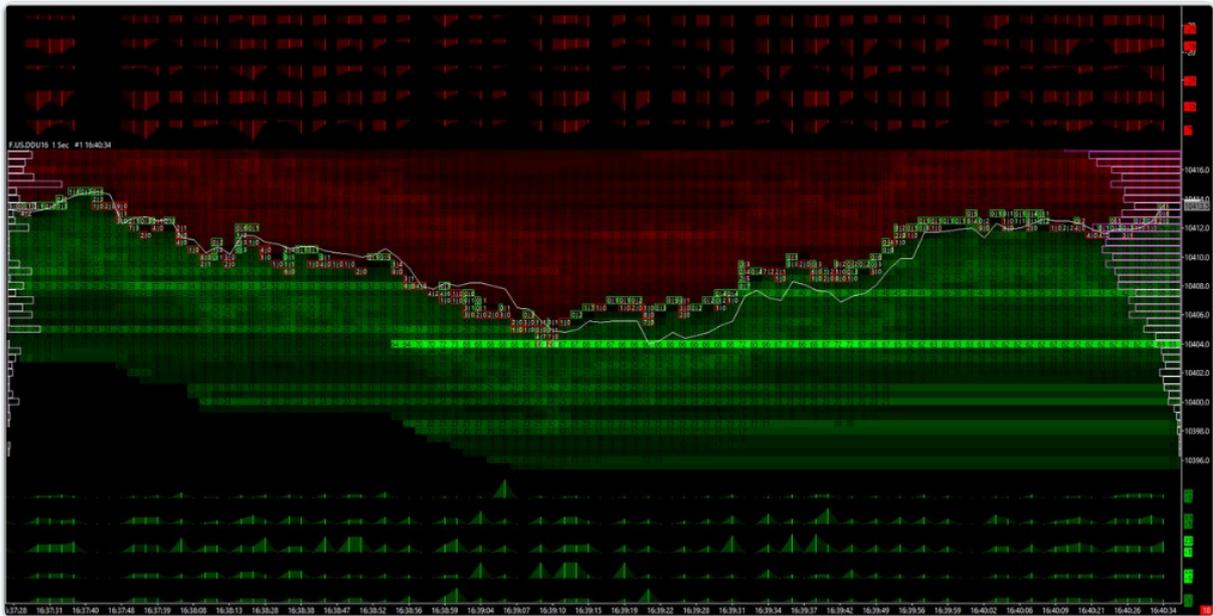


Other examples :

FDAX : the top of the day ... without comment
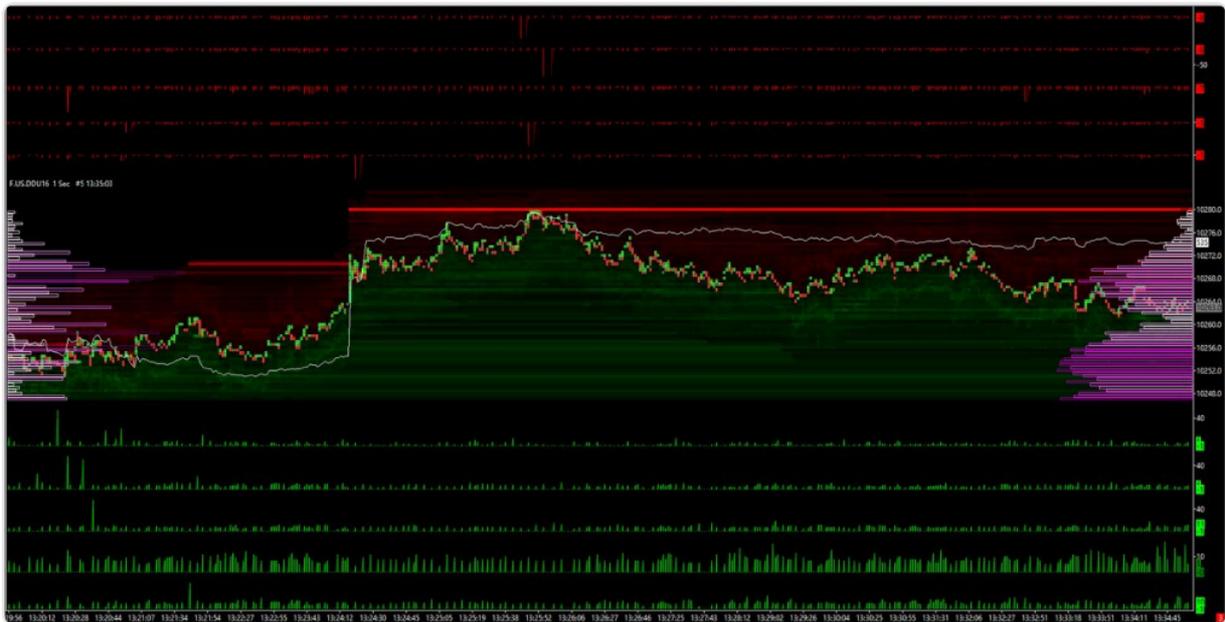
FDAX : 14H30 on 10 205...a 85 bid limit order appears to push the price up, partially filled, then replenished
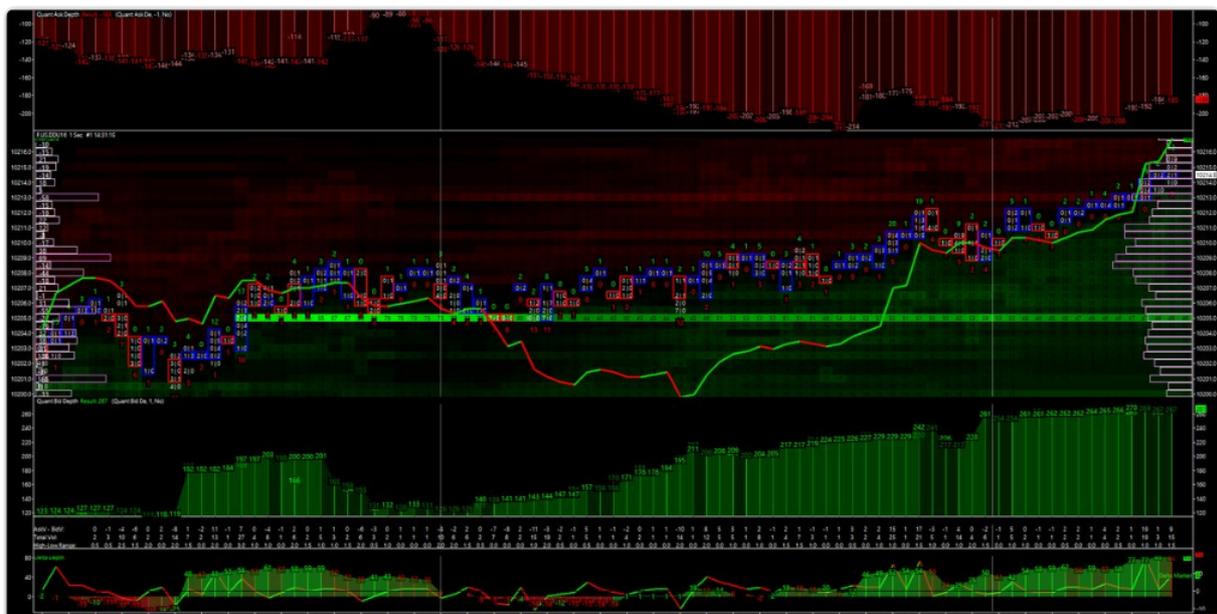
FDAX : simplicity #bid #depth protected on the same price as the last hour ..
#QuantMap #version7
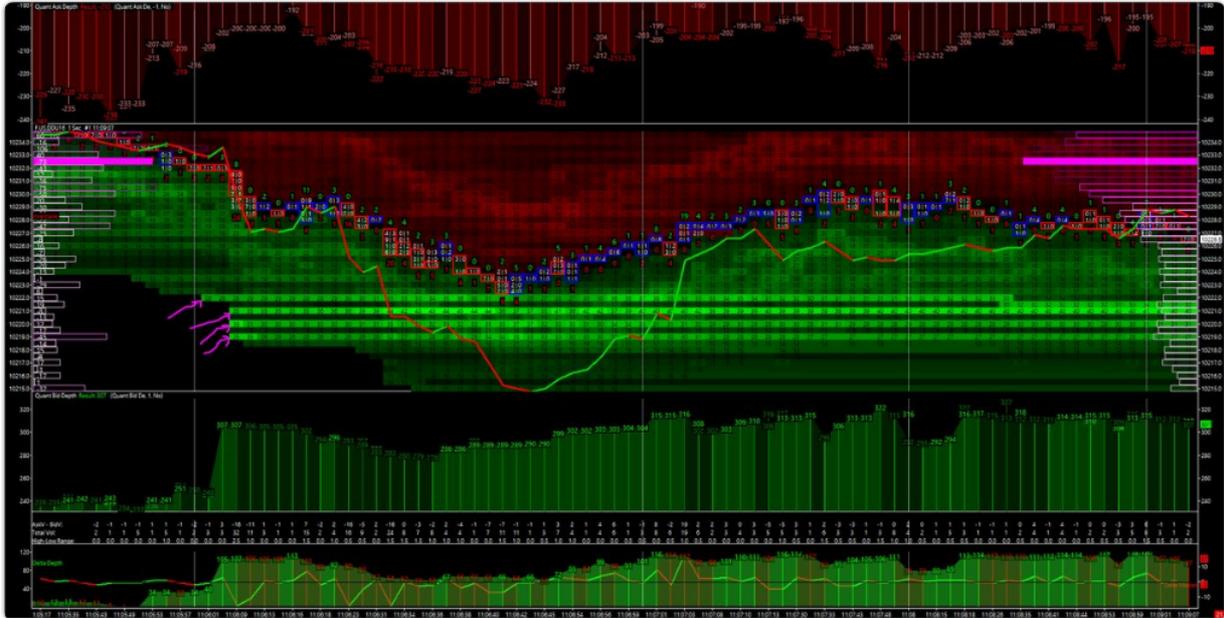
FDAX : when someone wants to save a key delta profil level ... (53 order available at the best bid at 10H38.49 CET)
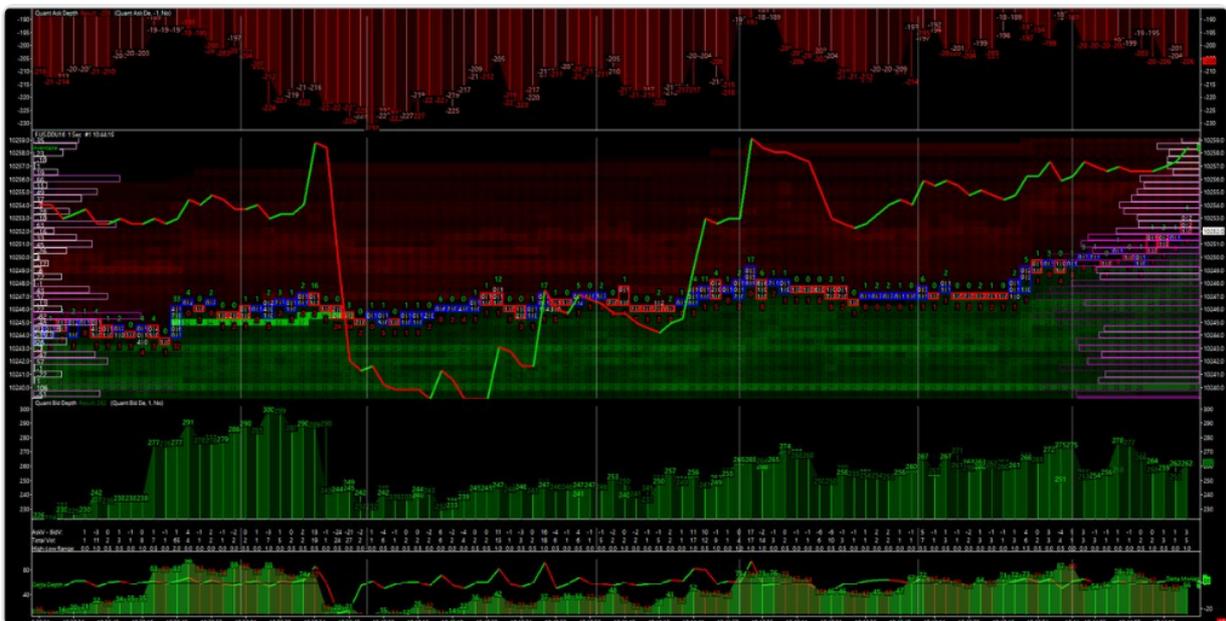
Other example :

GC : price control

Bid replenished and Ask removed during 5 seconds on the CL contract.
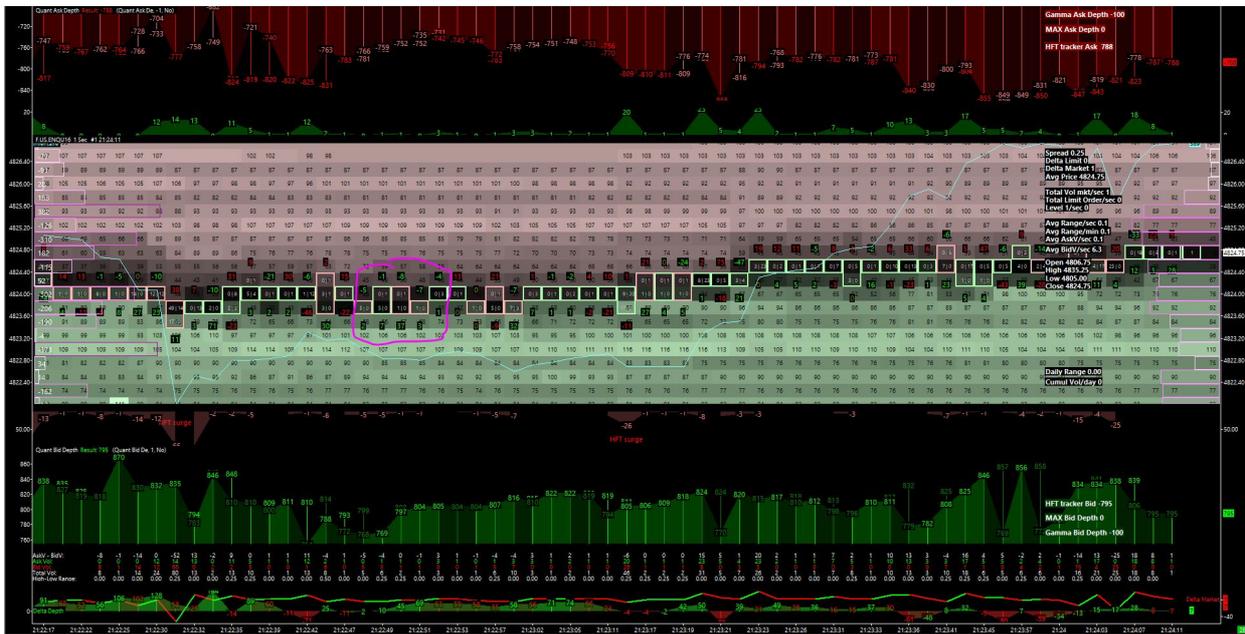
- Short description of the QuantMap V7 :
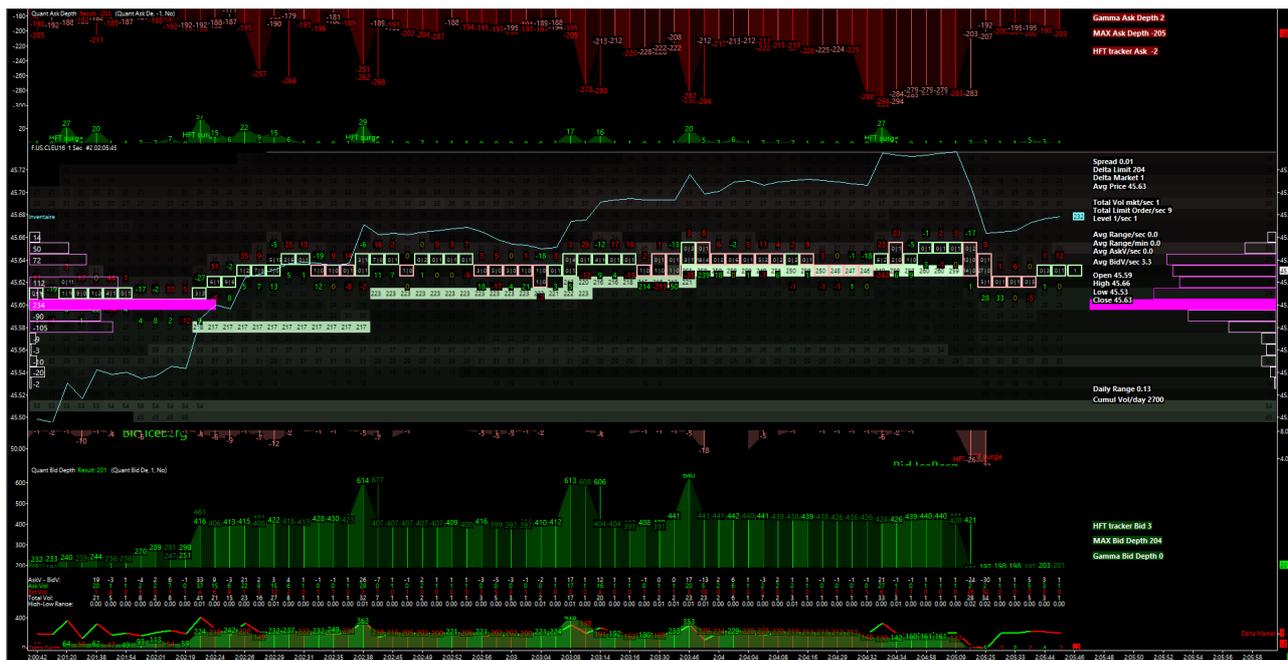
→ Why the QuantMap ?

With the advent of high frequency algorithmic trading [High Frequency Trading] and following the mass de-regulations carried out in recent years, and framed by armies of powerful lobbies belonging to the largest banks; it is clear that HFT robots, usually working in order book, [Depth Of Market] will represent a majority share of the total volume of the market.

The situation today is such that we have now, three companies that, ultimately, will manager alone, the entire flow of market orders and therefore represent a very important part and a large majority of all volume markets.

→ The evolution of the rules :

It's a real race for speed and more generally to the technology that is now in place: the more time passes, the more we realize that this endless race for innovation seems to have no limits.
In recent years, the market behavior of prices has changed and operators working in the order book [DOM] were also forced to change their strategies.

trading setups based on for example the Chartist or technical analysis performaient well 10 years ago, but often operate in a more hazardeuse today.

Indeed, the price formation mechanisms have evolved technologically and legally, and many approaches that are nevertheless widespread, became inoperative.
To cope with this development as a human trader and manual, the need to adapt, adapt its strategy to adapt its working methods, and finally even his way of thinking, has become today a priority to oversteer.

→ A relative transparency :

That said, the main problem that remains is that the information is distributed in a way that is not necessarily fair and that is no more relevant in its graphic representation. Pats exist [Time & Sales], notebooks exist, footprint exist, and all these tools to have a view of the volumes and liquidity clarified.

However, the information from a standard order book evolving at such a speed, the HFT market making has been very favored legally in recent years, it has become almost uninteresting to read a basic order book of especially when we do not understand what's behind.

The book turns into a useless tool to limit the human scale, simply because we are not robots that interact with millisecond.

→ Centralization of information:

So there is actually a certain opacity in the order book, and As has rightly been designed to see something in this ultimate manipulation tool called the DOM.

For the sake of precision gain in terms of timing and I / O in prices, it seems essential to centralize and synthesize information in a single tool: As has been developed and designed in this context. The main information is now available in a single system, on a single chart:

[Price] - [Time] - [liquidity] - [Volume]

→ A multi dimensional measurement:

Flows and datas, for some, you already have them. Today, innovation As is the way to graph this data there: indeed, the tool allows a multi-dimensional measurement of technical criteria seen above.

Representation of limit orders in both a vertical form [count], and in a horizontal form [map] enables a reading much more meaningful and fair, the flow of orders and prices.

After adding market data volumes, the tool offers a real unfolded and exploded 360 degree view of what the price of these markets.

The tool is proving to be so absolutely innovative and unique, both in its use for trading / scalping pure, for research and development work, programming algorithms and / or statistical studies.

We find in each of these tools the notion of "quant" for each feature a display of the available liquidity of the book in a multi-dimensional shape even within a multi-dimensional space: the limits corresponding to orders the available liquidity of the book are represented in both a vertical and horizontal plane, and for each depth level (in the case of QuantRun) or accumulated for 10 depth levels in the case of QuantBook and QuantMap.

With this unique visualization, it is possible to quickly and easily analyze the amounts of limit orders issued over time that passes, the price moves, to what is in front (to Bid or the Ask), what strikes market, but also in relation to what is above / below in terms of limit orders on the different levels of the book: we are immersed in a measure called multi-dimensional 'quantum' complete and extremely useful for scalping and daytrading.

That is to say a measure both graphical and quantified from the available liquidity of the book and the market order flow in an extended environment.

The QuantMap has a 'Heat Map' in color, with fully configurable and interactive platform. We can thus add or subtract there are any technical indicator.
This allows centralization and synthesizing information, datas, flow, and tools through a single chart: Quant.

The tool also lets see movement orders "inside" depth depending on the depth of the book. These features make the QuantMap an exclusive tool with a good view of the HFT market activities. The large operators are very fast, but they always leave traces.

Quant allows display of limit orders flashed very low theta (which are removed for example after 5 milliseconds) and is used to see if large limit orders have been flashed, consumed, partly or not, and / or removed.

The Quant has a refresh rate of the order of a millisecond, which is much lower than most other tools based on the order book or tape.

As it turns out to be a must, primary work environment of your toolbox for scalping and daytrading, whose strengths are:

- **Innovation**
- **Accuracy**
- **Exclusive**
- **Interactivity**
- **efficiency**

→ **Study of the resilience of a support / resistance to the order book :**

* **development of market making traps in the micro structure of the book :**

<u>Resilience</u> is defined as the financial industry, as the speed "x", which limits orders react at time t, compared to a price movement "y" which is performed at the moment t-1.

<u>In practice</u>, the measure of the resilience of a support or resistance then illustrate the evolution of the strength or weakness of the support / resistance, compared to price movements, and the passing of time.

-> Example on QuantMap DAX contract in September 2016:
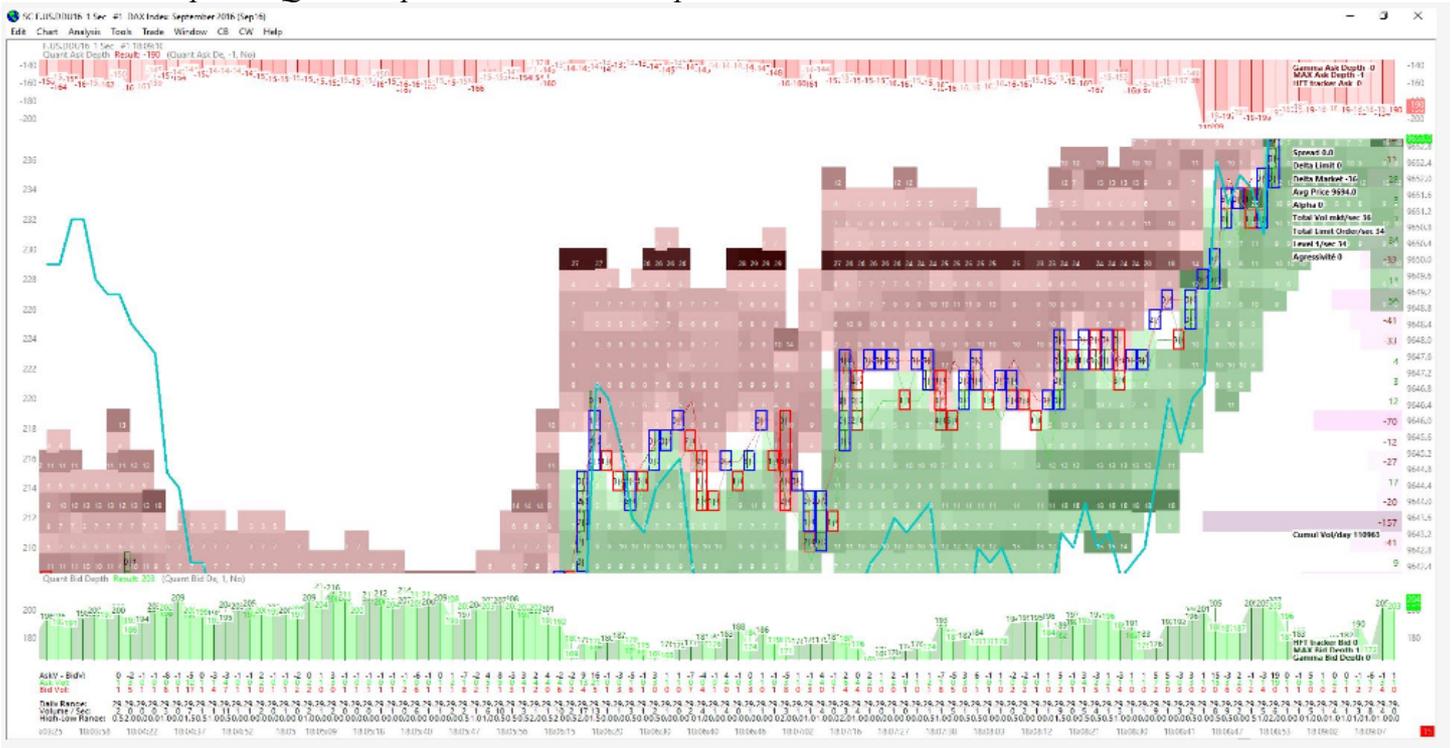
On this QuantMap DAX v6, we can see that the price is in the process of mounting and a resistor appears to ask the book for an initial amount of 27 limit orders available on the price level of 9650 to 18H06.17s.

Printed in dark red in the map quantified As of this command amat limit constitutes an apparent barrier to sales. The price action seems to be contained below 18H07.05s until then approaches the resistance in question only 5 tick of it after a few seconds.

It is at this point that we need scrutinize carefully the QuantMap to take any appropriate decision. What is happening at this resistance to ask? and at the depth corresponding bid?

-> Let's look more closely …
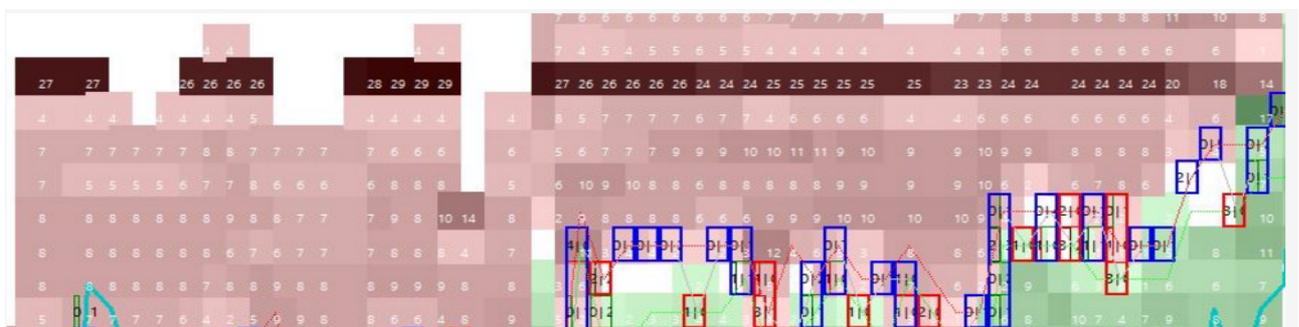
-> In this first phase, where the price remains under ten tick this resistance materialized by a limit order 27 to ask; we see that the resilience of this resistance is low, the initial amount remains in place, see increases significantly.

-> In the second phase, when the price approaches this resistance to notes, about 5 tick early, then 1 tick towards the end, we see very clearly that resistance is weakening; Indeed, the amounts of initial limit orders begin to be withdrawn by orders orders while consuming nothing comes to the market as the price stays below this resistance. The resilience of this resistance begins to increase; attention to bland shorts!

We see the end of this screen of QuantMap when the price approaches one tick of resistance to notes, it remains only 14 limit orders available to ask about what price level of 9650; ie that more than half of which has "evaporated" ... From ghost liquidity.

In addition, 13 orders removed limits to ask are (probably) the same (r) added to the level 1 of the bid to bring the price levels to 17 buyers limit orders in full. Flipping orders to ask to bid. The trap is in place. These configurations are quite dangerous to fader for sale when the resilience of resistance to the book is also strong, but appropriate to work a breakout.

**-> Let's see what happens in the bid book at the same time ....**
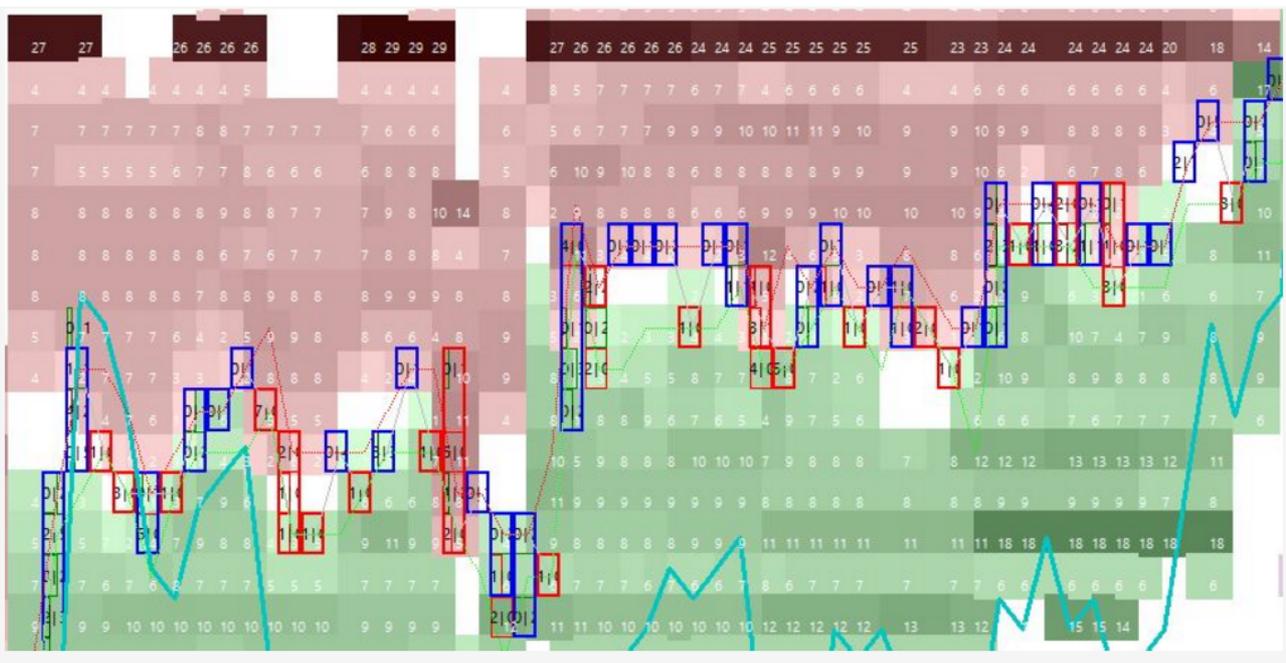
During the same time, and even though liquidity removes this resistance to ask because of this strong resilience book; one notes that the bid of the book begins to manifest, to organize, and to increase substantially the number of price levels simultannémment.

Barely 7, 8 or 10 contracts with price levels at the bid initially, which then turn between 12, 15 and 18 contracts when the price approaches the resistance famous book. The resilience of this newly-created media, is to Ascending strong, prompting the order flow markets in response to strike the available supply to ask the book.

At this point, it is quite risky to attempt a bland selling under this resistance, because it is clear that the pressure on the book is in the process of reversing. The process of additions and withdrawals of limit orders is spirited to make a fertile ground for buyers in this market. Rather than a bland seller, taking a long position to anticipate the break, limit orders or buyer above the resistance to work Fracture longer feasible.

This configuration is in fact a true open door that sinks in favor of a price increase following the withdrawal limit orders to sell, then the démentellement the remainder of the original amount (27-14 = 13) as well as 'the addition of limit orders to buy at the bid book.
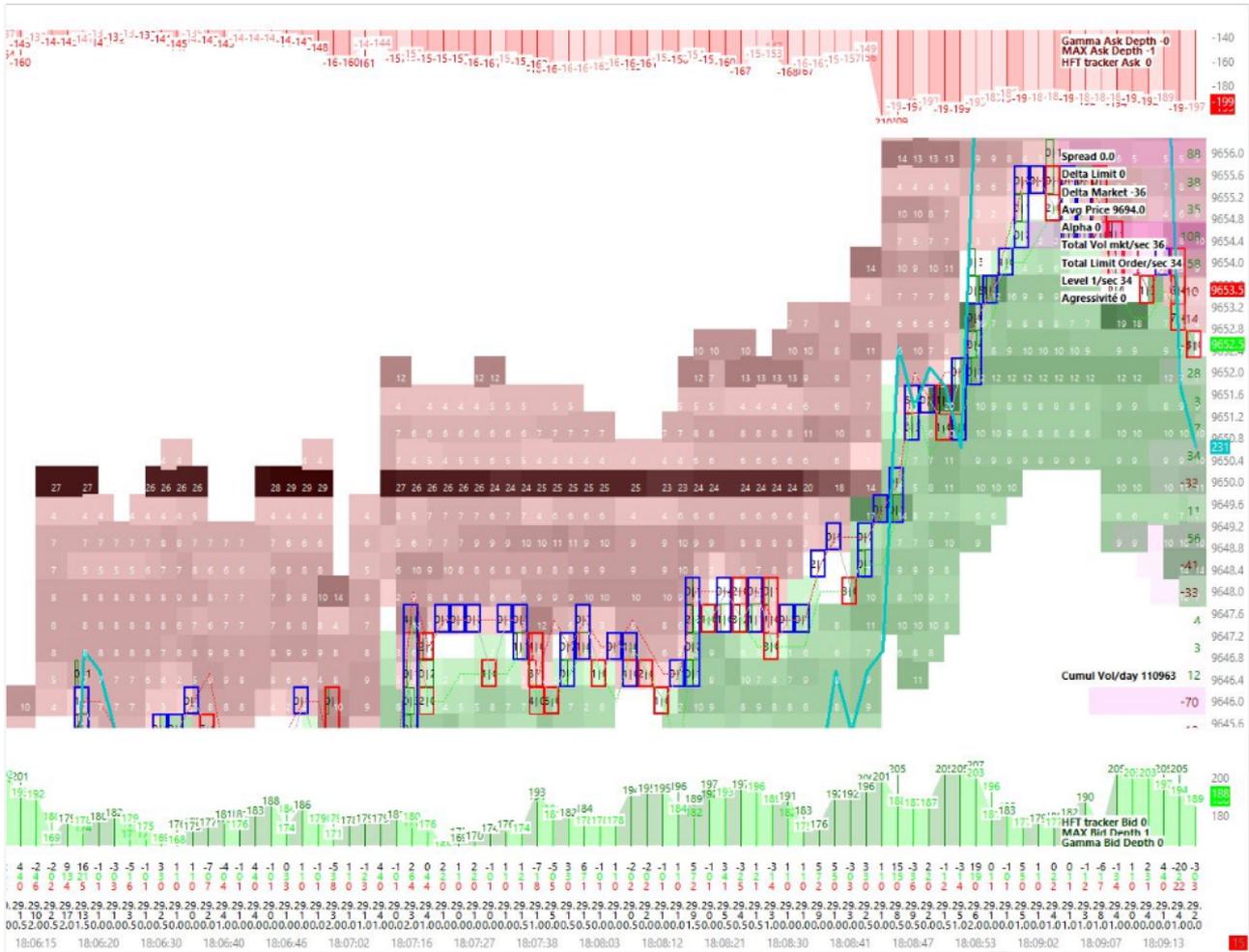
In conclusion, we see that the study of the resilience of a support or resistance in the book will be complete and extremely decisive for whether it should rather work fade or rather go with the flow.

In no circumstances will work a possible anticipation of breakage of a support or resistance, if it is spirit to strengthen. Conversely, in any case we will work a bland potential of a price, if it is seen that the resistance or support is used weakens.

-> More the resilience of a support / resistance will be strong, and more this support / resistance will be weakened.

-> More the resilience of a support / resistance will be low, and more this support / resistance will be reinforced.

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