

TRADING WITH MARKET STATISTICS by JPERL

Trading With Market Statistics I. Volume Histogram

This thread and succeeding threads will describe my use of market statistics as an intraday trading tool. I wanted to write this down some where for my own edification and perhaps introduce some new ideas that have not been expressed before. Perhaps some of these thoughts may be of use to those of you who are mainly interested in price action, and what market statistics implies about it.

We are all aware that price action is all about probabilities. One can ask the question, what is the probability that at any moment in time, prices will move higher rather than lower. To answer this question requires a knowledge of the probability distribution of prices or volume. The shape of the distribution, and where present price is in the distribution function, suggests in which direction to trade. If price is in a low probability region, enter a trade in the direction of higher probability. If price is presently in a high probability region, don't trade.

Sounds simple, but it's fraught with difficulties. Look at figure 1. This is a 2 minute candlestick chart for the E-mini Russell 2000 index futures for June 22, 2007. The volume distribution function is drawn on the left along the price axis with bars extending out to the right. The length of the bar is determined by how much volume was traded at that price. The longer the bar, the more volume traded at that price. Looks a lot like a Market Profile. In fact Market Profile is a subset of this more general probability distribution function.

Several things to note about it as follows:

- 1) The distribution of volume is roughly symmetric about the peak volume price occurring at 840.20 (indicated by the red line in the center) with some smaller peaks occurring both above the peak (at 842.30 and 843.60) and below the peak (at 837.20 and 836.60)
- 2) The distribution shows very low trading volume, in the high price area and low price area.

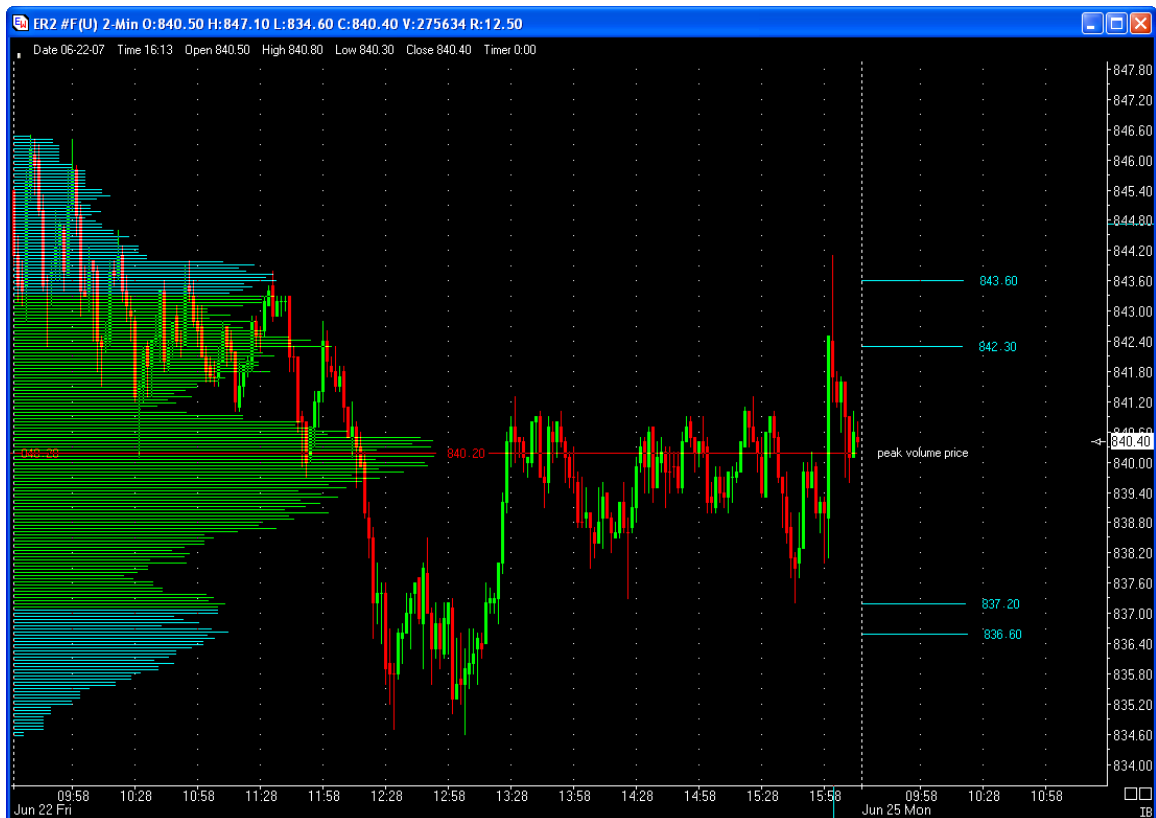


Figure 1

I point out this symmetry in the distribution mainly because it is unusual. It doesn't occur very often. More often than not, the peak volume price does not occur in the center of the distribution.

I've also shaded in light blue, the region outside what is called the value area for you Market Profile fans. The green region is the value area, the area where 70% of the volume has traded. I suspect that 70% was chosen as the value area because it is close to 1 standard deviation of a normal distribution (68.3%). The normal distribution is symmetric about the peak volume price. There have been lots of prognostications about how to trade when price moves back and forth across the value area, especially value areas generated the previous day. For a more or less complete list of these trade setups see the following [sticky thread](#) or [this site](#)

Simply entering a long where the volume distribution is low (below 836.60) and exiting the trade when price moves back into the high volume area (near the peak volume price) doesn't hack it, the reason being, that what looks like a low volume area now, could become a high volume area later on in the day. In actual practice, one never knows what the distribution will look like later on in the day.

Take a look at figure 2, which shows the same 2 minute chart of the Russell at 12:16 EST, 106 minutes after the open. The peak volume is at 842.30, and the last bar has closed in a low volume area at 839.90. The distribution looks pretty much symmetric. What do you do? You pull the trigger and go long. Would this have been a good entry? Apparently not. Price action drops the market like a stone as shown in figure 3. By 12:34, price has dropped to 835.80. You exit for a loss of 4.1 pts (\$410).

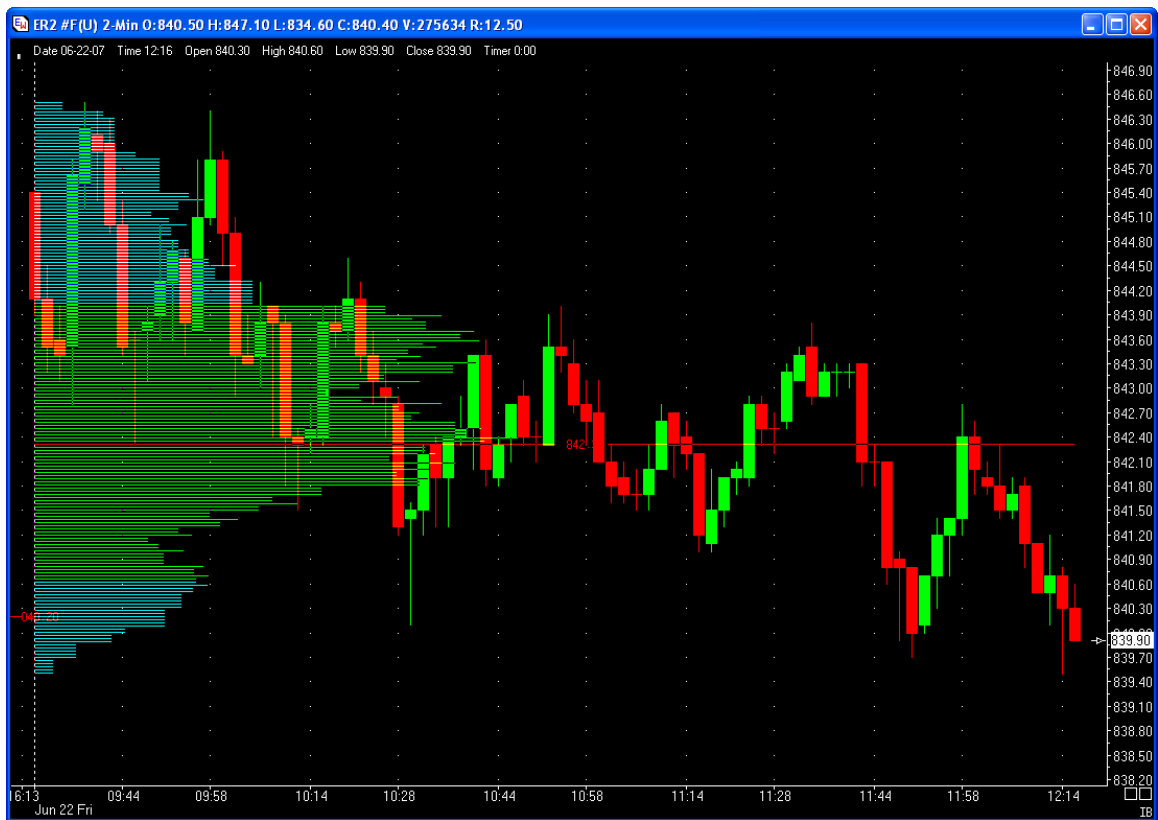


Figure 2

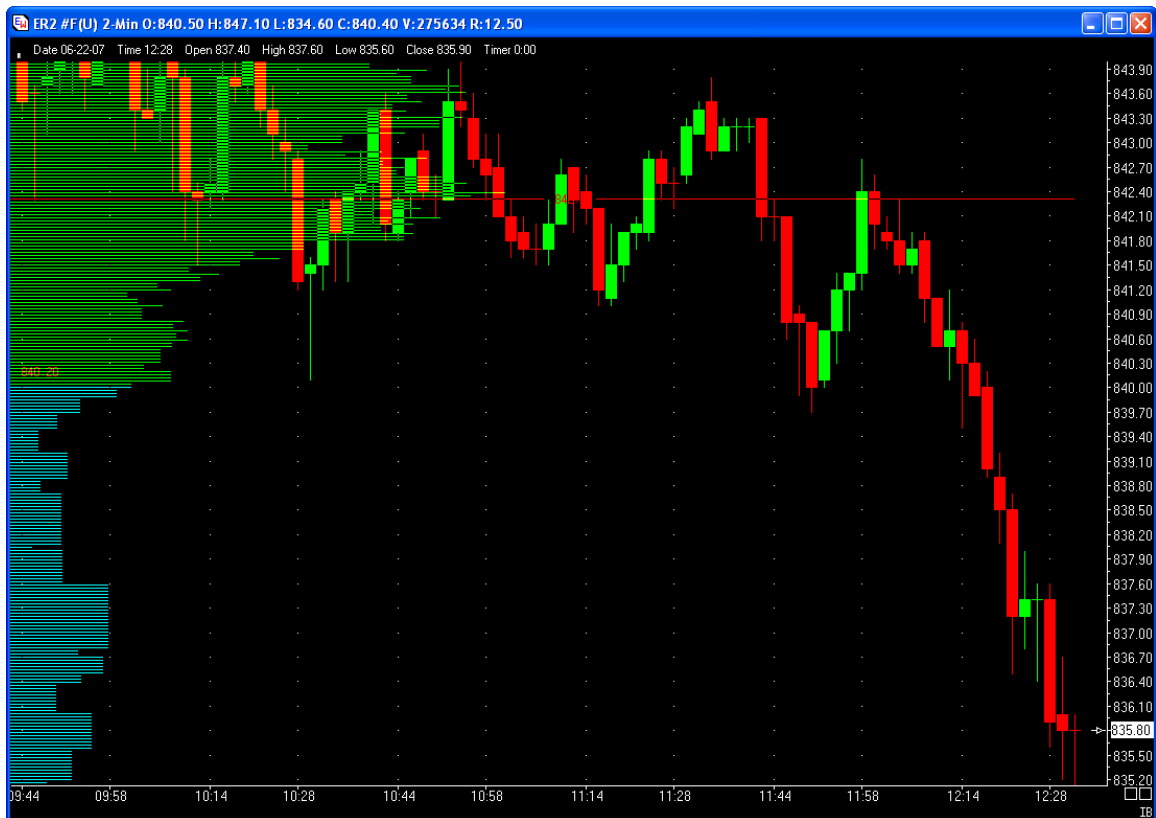


Figure 3

So what happened?

What happened was, the distribution function decided to expand. It would eventually expand so much, that the peak volume price would eventually move down to 840.20 (figure 1). In fact, you should NOT have taken the trade described above, for reasons which will be mentioned in a future thread, when we introduce the concept of the volume weighted average price, the VWAP in [part II](#).

Trading With Market Statistics.II The Volume Weighted Average Price (VWAP).

In a previous thread, [Part I](#) I introduced the Volume Distribution Function in the form of a volume histogram plotted along the price axis (see figure 1 of that thread). The length of the bars extending out to the right represent the amount of volume traded at that price during the day. The distribution has a peak which I call the peak volume price or PVP (also known as the Point of Control in Market Profile Analysis, but I won't use that term here in order to avoid any confusion). . The volume distribution is a probability function, thus trading occurs less often in the low volume regions of the distribution compared to the high volume regions. However I also stated that the distribution function is dynamic and that the shape of the distribution changes during the day such that the PVP may change abruptly as the trading day progresses. As such, if price action is in the low volume region, it does not mean that there will be a reversal back to the high volume region. The distribution function could simply expand itself and continue moving in the same direction with an eventual abrupt change in the PVP. This was shown by the price action in figures 2 and 3 of the previous thread.

In order to shed more light on this, I want to introduce the concept of the volume weighted average price or VWAP. The VWAP is a well known quantity used by institutional traders to gauge their trading performance. Its use as a day trading tool however has not been fully explored. The VWAP is simply the average of the Volume Distribution Function. The figures below show examples. The red line is the PVP of the distribution and the light blue line is the VWAP for the distribution. To compute it, take the volume V_i for each bar i in the distribution, multiply it by the bar's price, P_i , compute the sum, $\text{SUM}(P_i V_i)$ and divide by the total volume, V_{total} , for the whole distribution:

$$\text{VWAP} = [\text{SUM}(P_i V_i)] / V_{\text{total}}$$

The VWAP has the following characteristics:

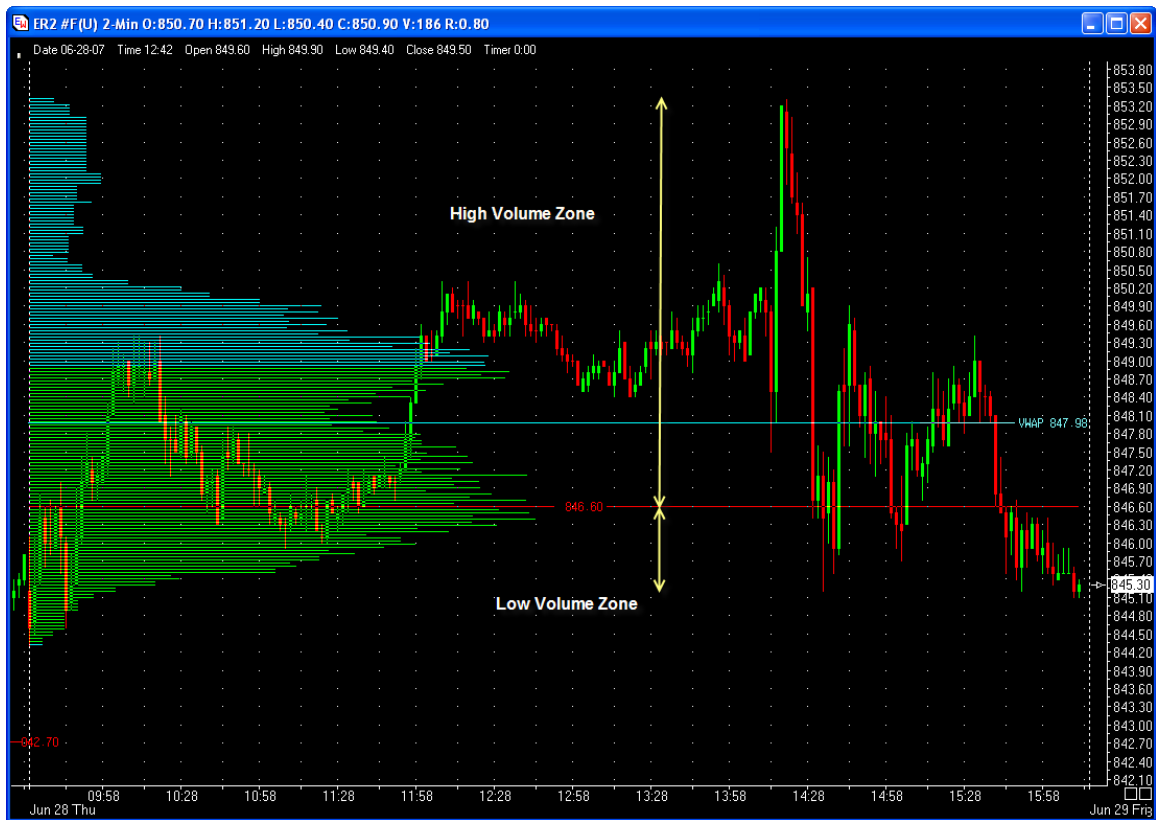
1) Being the average for the entire distribution, Volume traded above the VWAP is identical to volume traded below the VWAP.

In terms of the distribution function as a probability function, it means that when price action is at the VWAP, there is equal probability for price to move up as there is for price to move down.

As corollaries then we have:

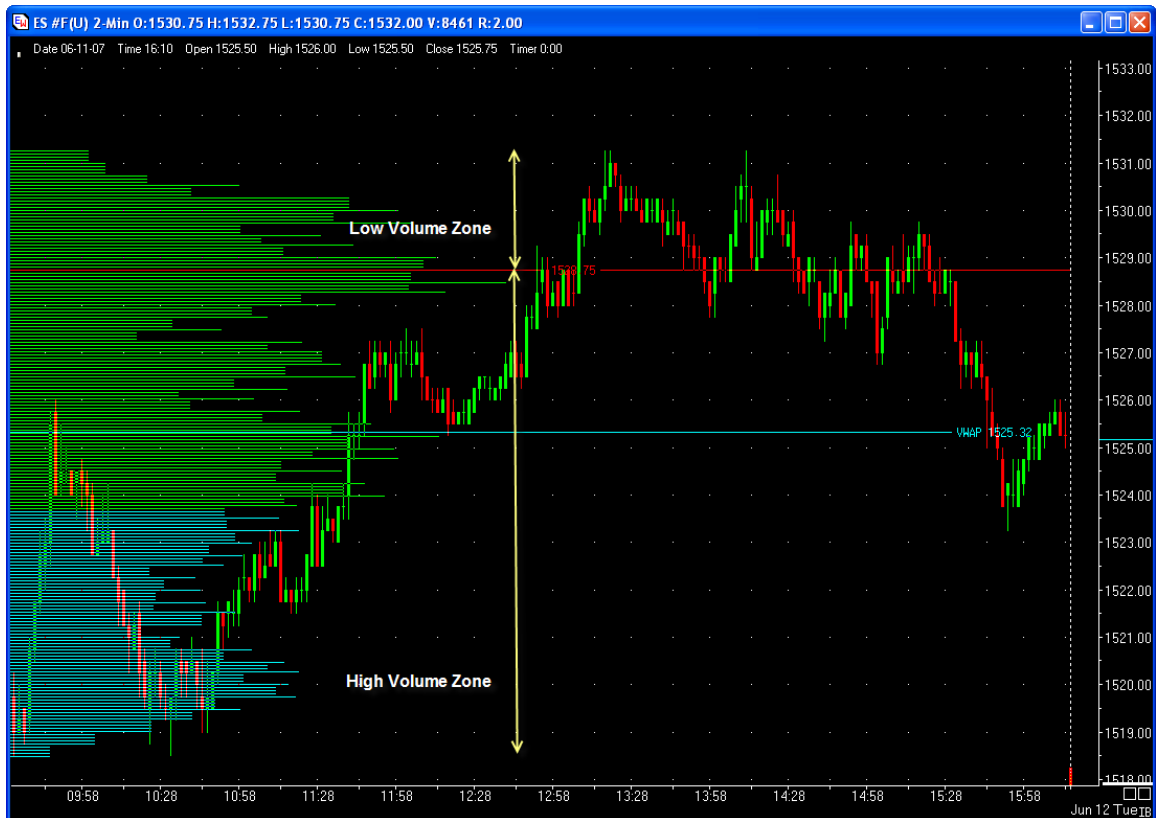
2) if the VWAP is above the PVP, then more volume has traded above the PVP than below it. The distribution function is thus skewed to the upside and the expectation is that at the PVP, price action should move up.

Take a look at the figure below, the ER2 for June 28, 2007.



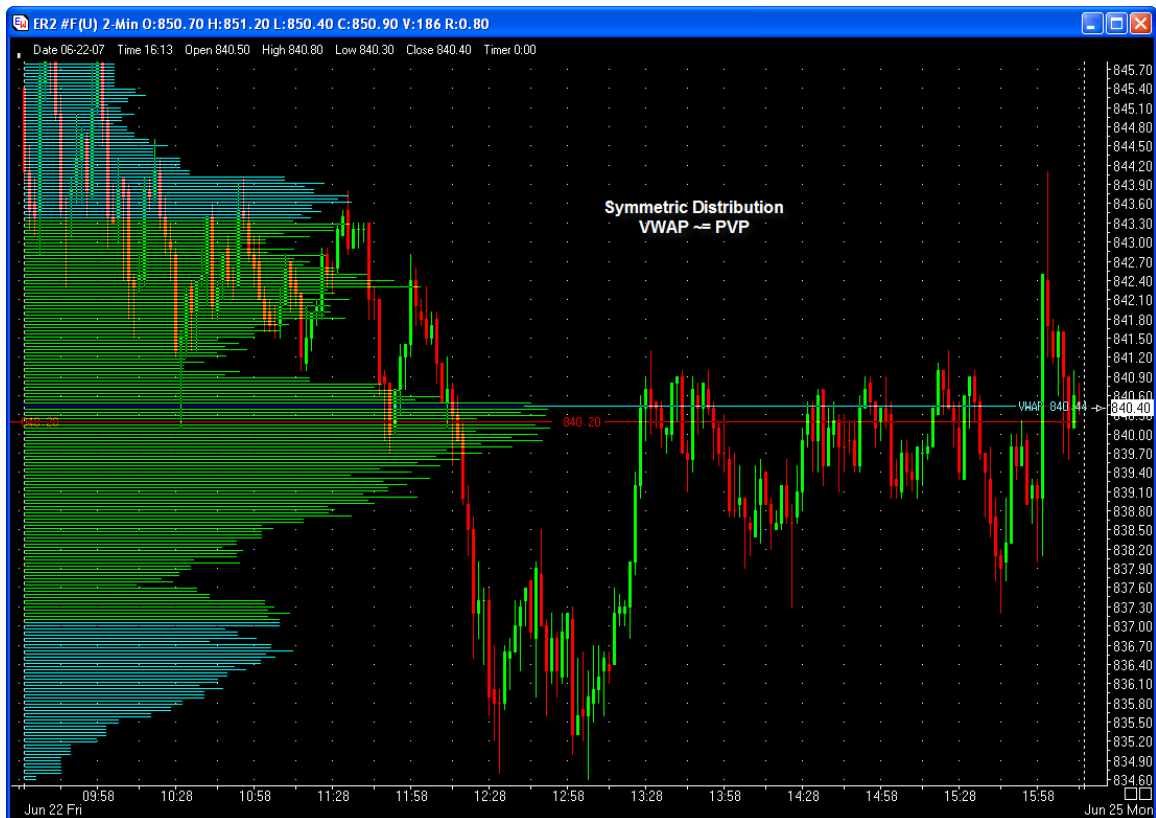
At the end of the day, the VWAP (light blue line) is at 847.98 and the PVP at 846.60. The VWAP > PVP hence more volume was traded above the PVP than below.

3) Conversely, if the VWAP is below the PVP, then more volume has traded below the PVP than above it; the distribution function is skewed to the downside and the expectation is that when price is at the PVP, price action should move down. You see this in the following figure for ES on June 11, 2007.



The VWAP is at 1525.32 and the PVP is at 1528.75. $VWAP < PVP$. Clearly the amount of the skew will be a function of the difference between the VWAP and the PVP.

4) If the VWAP approximately equals the PVP, then the distribution function is symmetric. In this case when price touches the PVP, there is no expectation of price movement in either direction. Instead, expect to see small oscillations about the VWAP. The next image shows this for ER2 on June 22, 2007.



VWAP = 840.44 and PVP = 840.20. Oscillations about the VWAP occurred for most of the afternoon starting at 13:30.

5) The VWAP and its relation to price also determines the trend of the market as follows:

- a) If Price >> VWAP, the trend is up
- b) If Price << VWAP, the trend is down.

6) Finally it doesn't matter on what time scale you plot the distribution functions and its associated VWAP. The chart could be a 1, 2, 3 minute etc time chart, or a tick chart, or a range bar chart or a volume bar chart. The distribution and hence the PVP and VWAP are all the same. You need only take a quick glance at the VWAP and its relation to price, to decide the trend of the market.

In future threads I will present some examples of how to use this information for entering a trade. In [part III](#) we will start with the newbies, since they need the most help. After that we will look at more complex situations using only the distribution function and the VWAP.

Trading with Market Statistics III. Basics of VWAP Trading

In this thread, we will present several videos to demonstrate how to use the volume distribution function and its associated Peak Volume Price (PVP) and its Volume Weighted Average Price (VWAP) as a trading tool. This thread will concentrate on

entries and stops only for new traders. Our trader for this is named NEWBIE. We will show how NEWBIE should use the relationship between the PVP discussed in [Part I](#) and the VWAP discussed in [Part II](#) to determine a) the region of the price action where he could be trading, b) the direction of his trade (long or short) and c) a possible entry point for the trade.

So let's get started. Below is the first video. We have a very raw newbie, who knows nothing about market statistics. He's trading the Emini Russell 2000 index futures by the seat of his pants. He thinks he knows the market direction from the premarket open and the first half hour of trading. He's heard something about trend lines and "The Trend is your Friend", so he enters a long trade, sets a profit target and a stop loss. Watch the video and see what happens. If you are a newbie yourself, see if you recognize any of NEWBIE's traits in yourself. The video ends with a short discussion of what NEWBIE could have done if he had used market statistics instead of the seat of his pants.

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#)

NEWBIE is now ready to take trading a little more seriously. After a minor disaster trading with the trend and getting stopped out, he's decided to look at the "Trading with Market Statistics" Threads and has read [Part I](#) and [Part II](#) at least a half a dozen times. He doesn't know much about statistics but he is willing to learn if it will help him with his trading.

What he has learned so far or at least should have learned is that market direction is reflected in the relation of price to the VWAP AND the relation of the VWAP to the PVP. Market data is skewed to the upside when the VWAP is above the PVP, skewed to the downside when VWAP is less than the PVP and symmetric when $VWAP \sim PVP$.

NEWBIE should be trading only in the high volume region of the price action so for NEWBIE to enter a trade, the following conditions should prevail:

Long Entry:

$VWAP > PVP$ and price action above the VWAP

Short Entry:

$VWAP < PVP$ and price action below VWAP

No Trade:

$VWAP \sim PVP$

NEWBIE is going to embed this in his brain so that it becomes second nature.

Download the following video and see how NEWBIE fares by following market statistics.

In the next thread, [part IV](#), our newbie will learn about other points where he can trade

NEWBIE wants to test his new found trading knowledge for other contracts besides the emini Russell 200. In this video he trades the Emini S&P500 for July 9, 2007. As usual, NEWBIE trades shorts when price action is below the VWAP AND the VWAP < PVP. So follow along as NEWBIE takes this ES short trade.

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#)

NEWBIE is on roll. He now has the PVP , the VWAP and their relationship down pat. He keeps his entries simple by trading short when Price Action < VWAP < PVP and trading long when Price Action > VWAP > PVP. He wants to test his new found knowledge on other contracts, like the Emini NASDAQ 100 (NQ). So here is NEWBIE'S NQ trade for today July 18, 2007. Watch the video and see how NEWBIE does it.

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#)

Trading with Market Statistics. IV Standard Deviation

Throughout the previous threads ([Part I](#), [Part II](#) and [Part III](#)), I have described the use of a probability distribution in the form of the volume distribution function as a trading tool. The shape of the probability distribution is dynamic, changing with time throughout the trading day. Nevertheless all information relating to price and price action is contained within this distribution function. Anything you want to know about price and price action can be obtained by analysis of the distribution function itself. No extraneous information from other sources is required.

We have so far analyzed the distribution in terms of two properties, a)the peak volume price (PVP) and b) the volume weighted average price (VWAP), which is the mean for the distribution. Both of these are dynamically updated throughout the trading day as the volume distribution function dynamically changes. In [Part III](#), we showed how the relationship between the VWAP and the PVP could be used for an entry technique in a simple newbie VWAP trading strategy.

But there is much more that is needed to advance beyond the newbie strategy. In this thread and succeeding threads, we will address the following issues:

- 1)Given an entry point, where should the profit target be set?
 - 2)What other entry points are there beside the VWAP?
 - 3)How can you tell when a reversal may be imminent?
 - 4)When is a breakout imminent?
 - 5)How do you trade the opening?
 - 6)When should you be looking for scalps.?
 - 7)How do you set stoplosses ?
- and related to this

- a) Should you set stoplosses?
- b) when do you scale in?
- c) when do you scale out?
- d) When do you reverse a trade.?

While we won't address all these questions in one thread their answers can be obtained by analysis of the volume distribution function. To do so requires that we introduce a third property of the volume distribution function called the Standard Deviation of the VWAP, SD for short. SD is computed from the following equations:

$$SD = \sqrt{\text{Variance}}$$

$$\text{Variance} = \sum_i [P_i (p_i - VWAP)^2]$$

where the summation subscript i , runs over all prices in the volume distribution
 p_i = i th price in the volume distribution

$P_i = v_i/V$ is the probability of occurrence of price p_i

v_i = the volume traded at price p_i from the volume distribution

V = total volume for the entire distribution

That's a mouthful. If you would like more details about the variance and the standard deviation, see the wikipedia reference

<http://en.wikipedia.org/wiki/Variance> and references therein.

So what does the Standard Deviation tell you?

Well for starters,

SD tells you how far you can expect price to move away from the VWAP.

It can be shown (but we won't prove it here) that computing the SD with respect to the VWAP gives the smallest expectation of price movement.

Put another way, if our newbie trader were to initiate a trade at the VWAP (which he/she already knows how to do from [Part III](#)), then the obvious place to put his profit target is 1 standard deviation away from his entry price. This is the least he should expect the price action to move price.

SD is thus a measure of market volatility for the time period over which the VWAP is computed. This gives NEWBIE a very powerful handle for his trading. If the SD is too small, he should stand aside. If it is too large, requiring a large stoploss, he might stand aside as well, if this frightens him. Too small and too large are of course qualitative terms which NEWBIE will have to decide for himself, but at least now he has a quantitative measure of market volatility and what he can expect when he enters a trade.

Watch the attached video [ESlongJuly23.swf](#) and see how adding the SD helps

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#)

NEWBIE set his profit target.

After using the SD for profit targets, a light bulb goes off in NEWBIE's head. He realizes something about entry points that he didn't know about before. If he believes what he is thinking, it will totally change his way of trading now and forever. Can you tell what it is?
Check out [part V](#) to see what it is.

NEWBIE now has an arsenal of tools to trade with, all generated from the volume distribution function. He knows how the distribution is skewed by comparing the VWAP to the PVP, and he knows how volatile the market is by including SD bands above and below the VWAP. The SD now determines his exit strategy. If he enters at the VWAP, his exit will be 1 standard deviation above the VWAP (for long trades) or 1 standard deviation below the VWAP (for short trades).

Here is an example from today's ER2 price action of a trade that NEWBIE takes with a **VERY LARGE SD**. Watch it to see how NEWBIE trades it. In this video NEWBIE has the opportunity to make 4 or 5 points because of the large SD. But he doesn't. He properly exits early. Watch it and understand why he exits where he does.

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#)

Trading with Market Statistics V. Standard Deviation Entries

NEWBIE has come a long way since his early days of using technical analysis. He no longer trades by the seat of his pants. He has a good quantitative feel for market statistics and he simply follows the statistics wherever it wants to take him. He knows that the volume distribution function contains all the information that he will ever need to institute a trade. He knows about the peak volume price, PVP, and can pinpoint that with good precision on his charts. He knows about the distributions average value, the VWAP, and he can follow it as it slowly evolves during the day. He knows about market volatility and he can quantitatively measure it using the standard deviation, SD, of the VWAP. He knows how to determine the market's skew from the difference between the VWAP and the PVP (skew is proportional to VWAP - PVP). He has a simple entry technique, entering at the VWAP in the direction of the skew, a good profit point measured by the SD and a good stoploss point at the PVP.

(As an aside, a discussion of distribution skew, also called kurtosis, can be found at this Wikipedia site. <http://en.wikipedia.org/wiki/Skewness>
We use the Karl Pearson definition of skew which is $(VWAP - PVP) / SD$)

But he wants more. He's discovered that trade entries at the VWAP don't occur all that often throughout the day. He knows the market can give more if he just knew where else he could enter a trade beside the VWAP.

NEWBIE is about to have an epiphany.

Suppose he enters a short trade at the VWAP, exits the trade at the 1st SD. Then what does the market do? If it rarely returns to the VWAP, then the only other thing it can do is drop below the 1st SD. Now here is the epiphany.

Another entry point is at the 1st SD itself.

NEWBIE knows this has to be a good entry because the volume distribution function being skewed to the downside, ($VWAP - PVP < 0$) will remain skewed to the downside only if the price action stays below the VWAP. Only two conditions will change this, a) The market stalls near the 1st SD such that the PVP abruptly changes to near the 1st SD or b) the price action takes the market back up to the VWAP and higher. We will discuss these two conditions in later threads, but first things first. Watch the 31 minute video and see how NEWBIE takes a trade at the 1st SD. Where is his profit target? The volatility is still in force. His profit target can only be one place, the 2nd SD.

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#)

NEWBIE is about to have a second epiphany. He's about to learn how he might change losing trades into winners by changing his ideas on stoploss placement. Check out [part VI](#) to find out how.

Trading with Market Statistics VI. Scaling In and Risk Tolerance

In [Part V](#) of this series on trading with market statistics (click here for Parts [I](#), [II](#), [III](#), and [IV](#)), I posed the question in the video about what TRADER should do if upon entering a trade at the 1st SD, the market should move against him. I suggested that based on the data given there was only 1 correct answer. That answer we will now discuss in this thread.

Before we address the answer, we need to discuss a related topic called risk tolerance. First what risk tolerance is not. It is not a stop loss that you set for each trade based on some support or resistance point you arbitrarily choose on the price chart. More often than not, this kind of stop loss is in the wrong place. These stop losses are not based on market volatility, but rather on some price point that "looks like it ought to hold", usually some local minimum (for long trades) or local maximum (for short entries). That they are wrong probably accounts for the large number of losing trades that new traders have. Unfortunately, most trading books tout these stoploss points as if they are written in stone. Phrases like, "you should only enter a trade such that your reward/risk ratio is 2:1 or greater" forces the trader to choose a stop loss which has nothing to do with the known volatility of the market.

So what should you as a day trader do about stop losses? Well for starters, you should set a "system stop". This is an in the market hard stop far from your market entry which protects you in case of system failure (eg, your computer crashes, you cable modem dies, you lose electric power in your neighborhood, etc.). It has nothing to do with the trade itself. Any other stop you wish to use you keep in your brain as a mental stop.

And where is this mental stop? Your mental stop should initially be a percentage of your account. Typical values bandied about range anywhere from 1% to 2% of your

trading capital. So if you have a 50K account, you should be willing to risk up to 1K on every trade. The mental stop is flexible, it won't increase, but it certainly can decrease depending on the price action. For example if the price action makes the trade profitable, your mental stop can become a hard trailing stop.

TRADER is now about to have a second epiphany. He is about to realize that by using risk tolerance instead of some fixed stoploss, he will be able to scale-in to a trade and not feel any angst about it, if the scale-in is within his risk tolerance limit. If it is not within his risk tolerance, then he should not have entered the initial trade to begin with. TRADER should always have a plan to either scale-in or to reverse a trade (to be discussed in a future thread), and the scale-in price should be a point where he could have taken a trade in the first place.

Risk tolerance and scaling in may make you feel queasy, because it requires a paradigm shift in your thinking about what trade management is all about. It is not about setting fixed stoplosses and profit targets and then sitting back and watching. It requires your active participation. Like the baby bird who is kicked out of the nest and told by its mother to either fly or die, if you are losing money from stoplosses and your account is slowly bleeding, you need to find a better way.

Now that our trader has some idea about risk tolerance, what does TRADER do when after his 1 contract entry at the 1st SD, price action takes the market backup to the VWAP rather than down to the 2nd SD? In the old paradigm of using fixed stoplosses, he probably would have been stopped out. In the new paradigm of replacing stoplosses with risk tolerance, you know what he has to do! He's done it many times before. The market is still skewed to the downside, he normally takes short entries at the VWAP. So why not this time? Indeed why not? TRADER pulls the trigger a second time and enters with a short at the VWAP because he knows that his risk tolerance is still quite large. He is now 2 contracts short. This is called scaling in. His expectation at this point is that the market will move back down to the 1st SD. Is this a reasonable expectation? Yes! Nothing about the volatility has changed. The SD is still where it was before the 2nd entry and that's the measure of volatility. Nothing's changed. TRADER should feel confident in pulling the trigger a second time. He is going to actively manage this trade. He still has a mental stoploss at his risk tolerance level. Where is his profit target? He has three choices now that he is short 2 contracts: 1) He can take 2 contracts off the table when price action hits the breakeven point-1 tick, 2) take 1 contract off the table at the break even point-1 tick and the 2nd contract off at the 1st SD, 3) hold both contracts and exit at the 1st SD. In all cases he ends up with a profit instead of a loss. Watch the video and see how TRADER manages his trade.

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#)

What TRADER did in the video is of course controversial (For previous discussions on this topic see the thread "Doc, my passion gives me much stress" beginning at [post 13916](#) where Dogpile expounds upon his firm belief in hard stops and my response. Also the discussion in the thread "[Scaling In and/or Out](#)" where I discuss the difference between scaling in and averaging down (or up for short trades) beginning at [post 13142](#).

Controversial or not, it is my firm belief that a trader needs to understand what scaling-in is all about. I personally didn't become profitable until I understood this and I use it as one tactic in my trading arsenal. If stoplosses are bleeding you, then consider this new paradigm.

If you have followed the details for scaling in, you should be able to answer the following questions. Take a shot at them and post your answers here

1) Assume your account is 50K and that you have a risk tolerance on any trade sequence of 2% of your account including commissions. A trade sequence is a group of related trades involving scale-ins and scale-outs and/or reversals (which we haven't discussed yet).

Let's say you trade the Emini Russell 2000 index futures where 1 tick is worth \$10 (0.1 points) and your roundtrip commission/contract is \$5.00. You enter a 1 contract trade long at the 2nd SD, but the market moves against you back down to the 1st SD where you scale-in another contract long. The market is relentless and it continues to move down to the VWAP where again you scale-in an additional 2 contracts long. Again the market continues its relentless move down. You finally hit your risk tolerance at the 1st SD below the VWAP, so you exit your entire trade and are flat.

Question: What is the value of the SD in ticks?

2) When you scale-in at the VWAP in the above scenario, the market finally rotates and starts moving back up. You exit the entire trade at break even +1 tick.

Question: Where is your break even point including commission measured in ticks above the VWAP?

How much money did you make on the trade?

If you were able to answer these questions without too much difficulty, then you are ready to become a full time trader with all the rights and privileges granted thereto. You are also ready for [part VII](#)

Trading with Market Statistics VII. Breakout Trades at the PVP

We are now in a position to discuss trading aspects at points in the volume distribution function near the PVP.

WARNING!! This is not for new traders. If you have not read and understood threads [I](#), [II](#), [III](#), [IV](#), [V](#), and [VI](#), and practiced with entries, exits and scale-ins using simulation mode until you are comfortable, then entries described in this thread are not for you (click on the thread numbers to see them). This is a dangerous place to be entering a trade. Anything and everything can happen and you can be caught with your pants down.

You are probably asking, why is JERRY telling me about this place to trade if it is so dangerous? Two reasons. If you are a basic trader taking entries at the VWAP and 1st SD, you might find yourself caught in this trap and not know what to do. Secondly, if you like excitement and like living on the edge, like the bikers in the first

attachment (a picture I found on the internet), and if you have a correct entry, there are lots of bucks you can pull out of the market by trading here.

So what's this all about? Well it has to do with price action at and around the PVP. The PVP as you've learned in [part I](#), is the dividing line between the low volume zone and the high volume zone. All of the trades we have discussed so far have been in the direction of the skew at the VWAP or its 1st SD in the high volume zone. When price action is around the PVP, it's decision time for the market. The market has to either move back into the high volume zone and continue trading there, or look for new territory in the low volume zone. Thus like the bike riders in the picture, you as a trader will be riding a fine line between the safety of the high volume zone, and the sudden fall into the abyss.

How does price action end up at the PVP anyway. There are only two ways: a) the PVP suddenly jumps to where the price action is or b) Price moves there. In either case, if you are in a trade, you are going to want to know what to do. If you are not in a trade, but want an exhilarating experience, here's your chance to do or die.

In case a) the skew suddenly flips its sign from positive to negative or vice versa. (Remember the skew is proportional to $VWAP - PVP$). While skew flips can occur anytime during the day, they usually occur early in the trading day when the volume distribution is beginning to form. Sometimes this is a sign of an imminent reversal. What should you do if you are in a trade and find yourself in this situation? Simple answer: GET OUT!, Dump the trade, win, lose or draw.

When price action is near the PVP, price is sandwiched between the VWAP and an SD or between 2 SD's. You might notice that price will tend to oscillate back and forth for a while between the VWAP and the SD, across the PVP line or oscillate between the 2 SD's. The market is thinking. Do I want to go back to the safety of the high volume zone where most of the trading has taken place or am I adventurous and want to discover new territory in the abyss of low volume. Don't trade in this region unless you are a scalper. Just wait. Wait for the market to decide what it wants to do, before you decide what you will do.

In the first video, we see price action in the PVP area with the VWAP on the downside. The Video shows when to take a trade to the upside on the break out of the 1st SD.

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#)
[YM BREAKOUT TRADE](#)

In the second video, we again see price action in the PVP area, but this time price breaks through the VWAP. We show how to apply the Shapiro Effect discussed in [post 16541](#) to enter the trade.

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#)
[YMWAP WITH SHAPIRO EFFECT TRADE](#)

And finally in the third video, we show a skew flip, where the PVP suddenly jumps to the price action. A trader may have taken a trade just before the flip as shown in the

video and exited before the flip occurred, but if he didn't he should exit at the flip price.

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#)
[ESSKEW FLIP](#)

Regardless of whether price action has moved to the PVP or the PVP has moved to the price action, the effect is the same. You are now looking at a zone where trade entry is precarious, so be cautious.

In the next thread [Part VIII](#), we will discuss what to do when the skew is close to or equal to zero and the volume distribution function is symmetric.

Trading with Market Statistics VIII. Counter Trend Trades in Symmetric Distributions

In the discussion about VWAP in [Part II](#), we introduced the concept of skew, a measure of how the volume distribution deviates from a symmetric or normal distribution. The sign of the skew allowed a new trader to decide in which direction he/she should look for a trade setup. Positive skew meant look for long trades only. Negative skew meant look for short trades only. We have yet to consider trading aspects in markets with symmetric distributions. Like breakout trades discussed in [part VII](#), trading symmetric distributions is an advanced concept. Not for newbies to be dabbling in.

A symmetric distribution is one in which the skew is very small or zero

$\text{Skew} = (\text{VWAP} - \text{PVP}) / \text{SD} \approx 0$.

There are a number of implications of this definition as follows:

- 1) a small skew means the VWAP is close to or equal to the PVP
- 2) Given a small or zero skew, it means that price action has moved across the VWAP at least once, otherwise the volume distribution could not be symmetric.

Now comes the kicker:

- 3) If the distribution is to remain symmetric, it must continue to oscillate across the PVP and hence the VWAP.

This implies trades of the following type:

If price moves to the 1st or 2nd SD above the VWAP pull the trigger SHORT.

If price moves to the 1st or 2nd SD below the VWAP pull the trigger LONG

WOW- that's completely opposite to everything you've been told in the last seven threads. Up until now, every trade was taken moving AWAY FROM THE VWAP. Now you have to learn to take trades moving TOWARD THE VWAP.

To trade a symmetric distribution, everything you have learned in the preceding threads is turned upside down. To complicate the situation, the condition for a

symmetric distribution is fuzzy. It's defined with skew approximately but not necessarily 0. There is also no guarantee that it will remain small. For example, suppose the skew is slightly positive and price action is around the 1st SD below the VWAP. You would look for long trades back toward the VWAP. But it is also possible for the price action to continue on down with the VWAP crossing the PVP and continuing on down. Like the breakout trade, trading a symmetric distribution has to be done with great care.

By its very nature, a trade taken toward the VWAP in a symmetric distribution is a counter trend trade. For example, when price is below the VWAP, the trend is down as defined in Part II. If you trade toward the VWAP then, you are taking a long entry in a down trending market.

Similarly for shorts.

Look at the first video and see if our trader can decide if the distribution is symmetric.

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#) [Symmetric YM Trade](#)

Advice: If you want to counter trend trade in a symmetric distribution, use the Shapiro Effect discussed in [post 16541](#) to decide on the entry. If the countertrend trade is taken at the 1st SD below the VWAP and the trade fails (price action drops below the 1st SD) you have two choices. 1)reverse the trade and take your profit at the 2nd SD or 2) hang on and scale in at the 2nd SD for the counter trend move back to the 1st SD.

Our trader in the first video was so sure that he would not want to take a short trade. But now watch the second video and see what our trader thinks now.

In the second video, our trader takes 3 trades, the first a standard breakout from the PVP area as discussed in [Part VII](#), the second a counter trend trade, and the third in the trend direction after a retrace. The last two trades demonstrate the use of the Shapiro Effect when the distribution is symmetric.

[VIDEO\[WATCH AT TRADERS LABORATORY\]](#) [NQsymmetric trades](#)

Clearly trading symmetric distributions is as difficult as trading breakouts. The choices can be quite contradictory.

Trading with Market Statistics IX. Scalping

If you have followed and understood all the "Trading with Market Statistics" threads, from the very basic VWAP trades in [Part III](#), and the SD trades in [Part V](#) to the more advanced trade types involving breakouts in [Part VII](#) and counter trend trades in [Part VIII](#), then you are ready to apply your new found knowledge to the fast and furious world of scalping

Scalp trading has many definitions depending on whose doing the scalping. The usual

definition is trading for ticks rather than points. But this is a purely heuristic definition. My definition is more quantitative and is based on when I start my volume distribution computation as follows:

a) If I start my volume distribution computations at the opening bell and continue until the closing bell, then that's a normal non-scalping trading day

b) If I start my volume distribution at any time after the opening bell, and watch it for short periods of time, then I'm scalping.

You know what a) means from the previous eight threads. What does b) mean?

Until now, I have talked about the volume distribution when it starts from the opening bell, and runs until the closing bell, that is regular trading hours.

However, there is no reason why you could not start the volume distribution computation at any other time during the day, let it run for say 15 minutes or so, trade off of it, and then restart it again. That's what b) means, and that's what I call scalping.

By doing this you are essentially looking at the market statistic over a short time frame and asking the same questions with the same responses as given in the last eight threads. The net result will be, you will be taking many more trades and trading smaller standard deviations. This is what is meant by "trading for ticks rather than points".

Scalping requires entries, exits, scale ins, scale outs, reversals and closes with one mouse click, otherwise you will miss the opportunity. To do this, you have to use a DOM (Depth of Market) or something equivalent as part of your trading platform.

Watch the video and see how I do scalp trades using the DOM.

[VIDEO\[WATCH AT TRADERS LABORATORY\]
ER2ScalpTrades](#)

Addendum: I was going to present a thread on the use of Hold Up Prices (HUP) which I've mentioned many times in these threads. I've decided not to do it now because it's quite complicated and I haven't yet found a simple way to present it. So I am going to delay that presentation until another time.

Trading with Market Statistics X. Position Trading

Position Trading is generally described as a trade which you enter and expect to hold for a considerable period of time during the day. Such a trade can be entered at any time after the open. My personal preference for a position trade is at the beginning of the trading day using market statistics from the previous day as my guide for determining entry, profit target, stoploss and scale in points if necessary. The direction of the trade is based on interpretation given in the last 9 "Trading with Market Statistics" threads but using the previous days statistics as the starting point. Position trading is thus no different than any other type of trading that I have previously described.

Here is the idea:

a) Set up a chart with yesterday's volume histogram, PVP, VWAP and SD's on it. Leave sufficient room to the right of yesterday's close so that at the open you can continue to add to the statistical data as today's market begins to unfold. In effect you are continuing to update yesterday's volume distribution as more data is added to the chart.

b) Before the open, decide on your trading plan. Pick a direction for the trade, an entry point, profit target and stoploss based on what you see in the volume distribution function. It will help to reread the previous threads to determine what you should be looking for.

c) When the market opens, execute the plan.

In the following video on trading the ER2 (Emini Russell 2000), you will see that the previous day's volume distribution ended the day in a symmetric state with the VWAP = PVP. I then concluded that I should look for a countertrend trade back toward the VWAP as described in ["Trading with Market Statistics Part VIII"](#).

Watch the video to see what I did on September 06, 2007.

xxxxxxxxxxxxxxxx [ER2PositionTradeSep06](#)

This trade was a good position trade which would have been even better if I had traded more than one contract. After having climbed up to the 2nd SD above the VWAP, the price action continued on down below the VWAP to the 1st SD and then eventually to the 2nd SD, a very typical signature of a symmetric distribution.

Trading with Market Statistics XI. HUP

This is the Market Statistics thread that some of you advanced traders have been waiting for. This is the "how to trade anywhere, anytime" thread otherwise called the "when not to trade thread", but not for NEWBIES. If you are a NEWBIE, back off and read the first ten threads on this topic starting [here](#).

One of the properties of most markets is the up and down motion that price action displays on virtually all time frames. Some traders call this the market volatility, others call it the natural market rotation. Newbie traders don't like this motion, because when they enter a trade they want the market to continue moving in their direction. Newbies fear volatility. Advanced traders love it. Whatever you wish to call it, it is this motion that is tradeable. In the words of Nihabaashi, "To fear volatility is to fear profits".

The main purpose of this thread will be to show how you can use market statistics to determine the most probable times when the market will rotate and when it will not. Once you know this, you can then enter a trade either in the same direction that the market is moving or take a countertrend trade in the opposite direction. If you have read the previous market statistics threads, you already know how to do this. Here I want to start to put this all together in terms of a generalized concept which I call HUP.

HUP stands for Hold Up Prices. As the name implies, HUP are those prices where the price action tends to hold up, that is where the market slows down, pauses, then either reverses (read rotates) or continues in the same direction.

There are two kinds of HUP, static and dynamic. Static HUP are those prices which are fixed for the day. They don't change with market development. In contrast dynamic HUP change as the day progresses. As new data is added, dynamic HUP will readjust to reflect the new data.

Below are some examples of HUP that can be used in daily trading

STATIC HUP

Yesterdays High,Low,Close
Overnight High,Low
Any computations based on these
such as classic pivot points

DYNAMIC HUP

Yesterdays PVP,VWAP and SD's
2 day PVP, VWAP and SD's
1 week(5day) PVP, VWAP and SD's
2 week PVP, VWAP and SD's
1 month(4 week) PVP, VWAP and SD's
2 month PVP, VWAP and SD's
1 year PVP, VWAP and SD's

You can of course come up with other examples of HUP, such as previous bars highs and lows, or 2 day or longer static HUP, or dynamic HUP that are in between the ones I have listed. It really doesn't matter. More important is to realize that these HUP points are prices where the market will tend to hold up.

What HUP doesn't tell you of course, is how long the market will hold up and/or how far it will continue in the same direction or if it reverses, how large the reversal will be. Getting the direction correct doesn't mean you can sit back and do nothing. You still have to manage the trade.

In the video that follows you will see a 15 second chart with HUP lines drawn on it.. Green lines are SD's above a VWAP. Red lines are SD's below a VWAP. VWAP are dotted blue. PVP are purple lines

Now watch this video to see where these HUP lines come from and how the market reacts to them.

[ER2HUPlinesOct24](#)

COMMENTS:

Thread1:

None

Thread2:

- Today's VWAP and PVP can be used for tomorrow's trade setups. We will cover that topic down the road when we get to more advanced types of trades. However, you will see in the videos that you can use today's developing VWAP to make trades today. This will be the basic VWAP trade that must be understood before we move on. Newbies will be able to get their feet wet here. A sort of crawling before we start walking.
- Market Profile Analysis is actually a subset of this more general way of looking at market statistics. There are important differences, however. a) Market Profile uses half hour increments for setting up the distribution. Generalized market statistics has no special time scale. b) I introduce the concept of the distribution average (the VWAP) which Market Profile does not use. c) There is no concept of value area as used in Market Profile. Value area is a purely heuristic invention. Rather we use the terms, high volume zone or high probability zone and low volume or low probability zone. In addition we will see later on that there is a generalized standard deviation of the VWAP which can be used as a measure of market volatility. But I am getting ahead of myself....so stay tuned.
- Yes NEWBIE for now only knows about today's data. We will leave to a later thread the significance of previous days, weeks, months PVP and VWAP. I will anticipate that discussion by telling you here that when NEWBIE is no longer wet behind the ears, he is going to want to know about previous PVP's, VWAP's, as they are going to tell him all about what price action to anticipate in the daily intraday time series.
As far as jumps in the PVP, that is another important event in the price action which we will discuss in a future thread. Again, I will anticipate that discussion by telling you that a jump in the PVP often will signal the onset of a reversal in the price action. For NEWBIE now that means exit the trade immediately and sit on the sidelines.
- *, Is there a mathematical proof which says that for ANY distribution $P[X \geq E(X)] = P[X \leq E(X)]$ i am thinking of VWAP as the expected value.*
- There is no proof Naveen, because my statement about equality is only partially true. It's true for the median value by definition. You can see why it is true for a normal distribution and other well known distributions when the mean equals the median. For all other non analytic distributions what you can say and prove is that the mean-median < 1 standard deviation The proof is [here](#) [proof](#)
- *can this method be applied to stocks too.*
- Short answer is yes. I qualify it with the statement, that there needs to be sufficient data to be statistically meaningful. So very low volume stocks would not work.
- I didn't have much discussion about trading at Old PVP's except for the post in the [HUP thread](#). There is a complete discussion of PVP trading at the ["Trading with Market Statistics VII: Breakout Trades at the PVP"](#) thread. In that discussion and in the HUP post, I point out that entering trades at the PVP is not a good idea. It doesn't matter whether the PVP is old or new, touched or untouched. The basic point is that if the skew is large, ANY PVP

represents a dividing line between the high volume area and the low volume area. If you take a trade at the PVP in the direction of the high volume area and it turns out to be wrong, you can be wrong big time with a large breakout into the low volume area against your entry. If the skew is small ($VWAP \sim PVP$), the volume is the same on both sides of the PVP. Then you might as well flip a coin. Bottom line, don't enter trades at the PVP, new or old. (This is in sharp contrast to the Enthios style of trading).

- The NTR is Enthios' estimate of today's trading range based on previous untouched POC's. I have looked at this concept but I have not found it of value.

Thread3:

- *What would you consider doing when VWAP is below PVP and price action is above PVP and thus above VWAP as well? On the chart I am looking at now VWAP is slightly below PVP but price action is quite above PVP, is this still considered a short entry?*
- Unleashed---good question. If you looked at the first video in this thread, you saw exactly that situation. If you are a newbie, you stand aside. Do nothing. In that video, NEWBIE took a long trade based on perceived market trend and was stopped out. Trading in the low volume region is dangerous and requires more advanced analysis. We'll get to that in future threads. In your chart, from what you describe, it sounds like $VWAP \sim PVP$. Again do nothing.

It's imperative that you understand the logic of the basic VWAP trade. It forms the foundation of everything that is to follow.

- *From a MP perspective when price trades into the low volume wouldn't we would want to trade as price is potentially looking to establish a new value area and potentially starting to trend ?*
- If you are a newbie, the answer is no. If you are an advanced trader, the answer is yes. You have to learn how to crawl first before you can walk. We will get to trading in the low volume zone in later threads.
- *I like your approach using VWAP however it seems to be most beneficial in establishing a bias. I also think it would keep you out of trend days like yesterday as there was no substantial reversion to a mean, just a steady climb throughout the day. Would you mind going over how VWAP and PTP looked during yesterdays action (7/12)?*
- Slow creep upward price action is difficult to trade under any circumstances. I actually traded yesterdays ER2 action. Took about 4 trades. Reversion to the mean (VWAP) doesn't occur all that frequently. You will have to wait until we talk about reversions to the Standard Deviation. Stay tuned
- As we will see later, the PVP is one example of a hold up price, HUP for short, prices where the market slows or reverses. More importantly for NEWBIE now, its the relationship between PVP and VWAP that is important for determining market skewness. When PVP and VWAP are close together, there is no skew. Volume distribution is then symmetric about the mean ($VWAP$). It's when they are further apart producing a market skew that things get interesting.
- What makes it difficult to trade even with market statistics, is that the slow creep usually hugs one of the standard deviation lines rather than rotating

between the SD's. As a result while you may have an entry point, you don't have an exit target that gets touched before you get stopped out.

Thread4:

- There is a solution to this which we will eventually get to in later threads having to do with how you incorporate previous days, weeks, months VWAPs and their SD into today's price action. At this point in time, our NEWBIE trader waits for the distribution to develop and also waits for the price action to touch the VWAP. But, coming up in the next thread, we will introduce a paradigm shift in NEWBIE's thinking. Stay tuned.
- I have a problem using rolling 90-minute periods or for that matter any N-period method for computing the SD or N-period technical analysis in general. (This includes all moving averages, CCI's, stochastics, MACD's, RSI's and any other method that requires a period length, and yes, sad to say Market Profile Analysis which uses 30 minute periods and an arbitrarily defined value area). The period length is arbitrary and would have to be readjusted when market properties change as they do daily. This is why I am presenting this general statistical method of viewing the markets. It's independent of period length of your chart and only depends on your starting time. As we delve deeper into this you will see the utility of using this generalized statistic
- I don't use Market Profile terminology to describe the Volume Distribution function. Throughout these threads, I have not offered an explanation of why the PVP is where it is or why it moves from point to point. I don't use terms such as "value", or "value area". The fact is, it doesn't matter. I just accept the statistic for what it shows.

The PVP serves two purposes:

- 1) It acts as a Hold Up Price or HUP for short. A point where the market pauses before continuing on or reversing
- 2) Along with the VWAP it defines the skew of the market. How much the market deviates from a symmetric distribution.

For a NEWBIE trader, the skew of the market is his lifeblood. He needs to know how skewed the market is before he will enter a trade. And he will only enter a trade in the direction of the skew.

The extent of the skew is defined by the difference between VWAP and PVP
 $\text{skew} = \text{VWAP} - \text{PVP}$

so if the skew is positive NEWBIE takes long trades only
if the skew is negative NEWBIE takes short trades only
and if there is no skew (skew close to 0) no trade

It doesn't get any simpler than this.

Eventually NEWBIE will learn how to take trades against the skew. But for now he needs to understand the basics

- *Thus, if PVP is above the VWAP, expectation is for 'next PVP' to be something that is closer to the current VWAP and therefore odds favor the short side? and vice versa... is that right?*
- This is a Market Profile interpretation, that somehow markets if they are "out of balance" (that is skewed) will somehow move back into balance (market skew = 0).
There is no evidence to support this assertion. And as far as intraday trading is concerned it isn't necessary. A NEWBIE trader simply needs to trade in the direction of the skew and avoid trading when there is no skew.
An Advanced trader can do many other things (Trade against the skew, trade when the skew is 0) but NEWBIE is not ready for that yet.
- The skew would reset, only if the market stalled with a build up of volume to move the PVP. It takes a large volume to do this. NEWBIE, being the alert trader that he is would notice this immediately. So if he was in a short trade (negative skew) and the skew reset and turned positive, he would bail out of his short position as shown in the video. What he is hoping for of course is that price action will take the market to the first SD before the skew resets. In either case, he takes money off the table.
- *First, regarding the VWAP, PVP, and SD do you use the previous day value for these? For example, at the open what values do you use and when do you adjust the values for today's trading in real time?*
- The thread on position trading [Part X](#) describes how I use the previous days volume distribution to take a position trade near the open. Today's developing volume distribution is simply added onto yesterday's. Once the position trade is completed, I then switch to using today's volume distribution for further day trades.
- *Second, you mentioned to stay away from trading around the PVP as market indecision takes place. I have been using the POC as a potential support/resistance the entire time and found this concept quite interesting. Could you care to elaborate on this?*
- I pointed out in this thread that the PVP is a dividing point between a high volume trading zone and a low volume trading zone. Consider for example a distribution with a negative skew. Several things can happen around the PVP as follows:
 - a) Price can break out into the low volume zone above the 1st SD, in which case you want to go long or
 - b) Price can break back into the high volume zone below the VWAP in which case you want to go short or
 - c) Price action may simply oscillate between the 1st SD and the VWAP, in which case you might consider a short after a bounce off the 1st SD or a long after a bounce off the VWAP.
 So at the PVP itself you have no idea of any expectation until one of the above 3 conditions occurs
Trading at the PVP thus becomes a slippery slope as I described in [Part VII](#) .

- *Third, when the skew is negative but price is trading above the VWAP, do you not fade a retracement back to the VWAP to SD1? Or would you wait to fade the SD1 above the VWAP and a target back to the VWAP?*
- Not quite sure what you meant in the first part of this question. With a negative skew ($VWAP < PVP$) and price action above the VWAP, wait for a breakout to occur above the 1st SD for a long trade. If that does not occur (if for example price bounces off the SD) then go short with the VWAP as the profit target. As I indicated above you might get oscillations in this region between SD and the VWAP.
Once the breakout occurs say above the SD, you would only consider long trades away from the VWAP. example a retrace to the SD, go long, or if price action is above the 2nd SD, again go long on a retrace to the 2nd SD. Such trades should be viable as long as the skew is negative. Eventually however the skew will become zero as the breakout continues. It's at that point you would take a countertrend trade TOWARD the VWAP. This is described in the thread on counter trend trading [Part VIII](#)
- *Fourth, do you play the range between SD2 and SD3?*
- Above SD2, you are on your own. I usually don't take trades above SD2, mainly because continuation to SD3 is not that viable. And as I say that, you realize that in the last two months trades to the SD3 and beyond have become quite common.
- *Is any price movement extending beyond SD3 a fading opportunity? I have been using your concept to observe the Nikkei and have found price to break out of SD3 at times and never fall back.*
- Beyond SD3 is no mans land. When I see the market extend beyond SD3, I just shake my head in amazement, take a break and go have a cup of coffee
- So when should you first consider taking a trade? My rule of thumb is, don't trade until the range of the bars on your chart are less than 1 standard deviation. If the high of a bar touches 1 SD level and the low of the bar touches a second SD level, then the bar range is too large to consider entering a trade on that time frame. You either need to wait until the bar range gets smaller, or go to a faster time frame.
- No I don't start a new VWAP every hour. You lose two important pieces of information by doing so: a) The present trend, determined by price relative to the VWAP and b) the day's volatility as measured by the standard deviation. The present trend determines my bias and thus whether I will favor longs or shorts. The SD tells me how much I should expect to pull out of the market when I trade. I don't want to lose either of those two pieces of info by restarting the VWAP computation.
- How large does the skew have to be to consider taking a trade at the VWAP or SD in the direction of the skew.
The answer is: I was concerned about this for a long time. It turns out, that there is no correlation between the size of the skew (as measured by the Karl Pearson definition of skew which is $(VWAP - PVP) / SD$) and the momentum of the trade in the skew direction. What only seems relevant is that a skew exist. Other HUPs will come into play between the entry point and the profit target which will play an important role in the momentum of the trade.

- Your initial thought was correct
The sign of the skew tells you where most of the trading has taken place.
Positive skew: Most of the trading has taken place above the VWAP
Negative skew: Most of the trading has taken place below the VWAP.

Your first order of business when looking at a volume distribution is to determine the sign of the skew. Once you have done that, see where the price action is.

- a) If price action is above the VWAP and skew >0 , look for long trades only.
- b) If price action is below the VWAP and skew <0 , look for short trades only.

These are the best trades to look for and Newbies should only do these to begin with. When you take these kinds of trades, you will be trading in the high volume zone of the distribution.

It's when price action is BELOW the VWAP and skew > 0 or price action is ABOVE the VWAP and skew < 0 that things get interesting and exciting. Then your looking for breakouts into the low volume region with range extension. "Exciting" means "Living on the edge". If you like the rush of living on the edge, then look for trades in the low volume zone. These types of trades are described beginning in [Part VII](#)

- Near perfect balance would be price = PVP = VWAP.
Very often when PVP=VWAP, price action can be far from the PVP, even as far as the 3rd Standard Deviation. That's not a balanced market.
- Since today's distribution has not developed yet at the open, use yesterday's distribution and simply add on to it as the morning price/volume data develops. I do this for position trades as described in [part X](#). You can then switch to today's distribution at your convenience.
- To restate this question, how large does the SD have to be before you enter a trade?
If you are only using today's distribution, then at the open, the SD is virtually zero. As more price/volume data is added, the SD grows. What's nice about watching this is you can see how the volatility is changing as the day continues. First growing, possibly leveling off, then growing again, then reaching some kind of stasis.
So when should you first consider taking a trade? My rule of thumb is, don't trade until the range of the bars on your chart are less than 1 standard deviation. If the high of a bar touches 1 SD level and the low of the bar touches a second SD level, then the bar range is too large to consider entering a trade on that time frame. You either need to wait until the bar range gets smaller, or go to a faster time frame.
- *Would it not make more sense to convert the VWAP bands into an oscillator*
- That's fine for the forward candles, (the ones all the way to the right).
However the oscillator gives the wrong impression about where price has

been relative to the standard deviations in the past, due to the fact that the standard deviation lines are renormalizing with each added data point. For example from 12:20 to 12:50, the lows of all the candles touched the 3rd standard deviation price which kept renormalizing to a lower price. The oscillator on the other hand gives the impression that none of those candles touched the 3rd standard deviation until about 12:40

- THERE IS NOTHING THAT I PRESENTED THAT ASSUMES A NORMAL DISTRIBUTION. One does look at a finite sample population and that sample population has a mean, a standard deviation, a skew and a kurtosis. Those are the first four moments for the distribution. This implies nothing about the distribution being Gaussian(ie normal). Every finite distribution has these properties. These moments can and do change with additional data added to the population. I think I have shown this numerous times in the videos. How you might use this information depends on your trading style. I presented some simple ways as example, but there are many others. The question you might raise is: Is this statistics the best way to view the data or are there other ways. At the moment this is the best I know. There are other alternatives such as fractal analysis a la Mandelbrot or perhaps some kind of Bayesian analysis.
- Sorry Head, but this is incorrect. A skewed distribution MAY return to a SYMMETRIC distribution, which is not the normal one. Notice my emphasis on MAY and SYMMETRIC. Using the exact definition of skew which you presented, a skew of zero does not imply anything about the distribution being normal, only symmetric. Example would be a double peaked distribution which is far from normal. There are many others. Moreover, there are many days when the skew never returns to zero.
- I learned something new from you HEAD when you presented a way of looking at the skew using the exact definition of the third moment. There is more there than I think you realize, certainly more than I originally realized using the approximate definition. One of the most difficult problems traders have commented on to me using market statistics is how to decide which direction the market will go once it touches a standard deviation point. Knowledge of skew action can help in this regard. Perhaps I will start a new thread on this if I can find the time.
- I agree with this. I hope I haven't mislead anyone into thinking that what I presented is a "system" for trading. It is rather a way of looking at the data from which you have to develop your own trading style. I presented some simple ways that you might use market statistics to trade, but in the final analysis every trader must develop his/her own style.
- If you scaled in at VWAP and there was no retrace back toward break even, it suggests the market is strongly moving against you. You might want to consider a reversal trade provided you are still within your risk tolerance for the day.
- I introduced the approximate skew because it was easy to visualize, and required no further computation on the part of the trader. However since Head did the complete computation of the third moment, I took a closer look and it seems like that may be a better alternative.

- The deviation is from a symmetric distribution which can have any shape. You seem to have a fixation that averages only have statistical significance if the distribution is gaussian. Nothing could be further from the truth. You can always define an average for a finite sampling of data. The question that you should be asking is, is the average stable or does it change if you take a different sampling of data?
- Based on the history of all financial markets, they are all unstable. This includes normal distributions which don't remain that way for very long. This does not mean however that you as a trader should not use the evolving statistics as a framework for deciding both trade direction and trade management. On the contrary, without the statistical information you are depriving yourself of what the market's price action might be like. For example, if I enter a trade, how much should I expect the market to move. The answer is simple if you are following the market statistics. It's one standard deviation.
- *Is your use of Skew and VWAP the only solution (that you know of) to having to deal with unstable distributions?*
- I don't know. There is considerable research going on in this field associated with unstable time series evolution. Examples would be fractal analysis and other non-linear dynamic analysis (chaos theory and complexity theory). I'm in the process of looking at these in some detail, but haven't reached any conclusions yet in so far as there use for traders.
- You have this correct Pepperdog. A newbie trader would just have to sit and watch, while the market moves against the skew. After you feel comfortable trading in the skew direction, you can become a more advanced trader and trade against the skew as well. This is discussed in some detail in the later threads on Market Statistics. The skew then no longer becomes a relevant factor in your trading. However be careful here. You need to know that you are doing this and what it implies. Trading with the skew is the teaching mode. Trading against the skew is where the real action lies. You can't do the latter unless you're comfortable with the former.
- No Ramora, I don't start a new VWAP every hour. You lose two important pieces of information by doing so: a) The present trend, determined by price relative to the VWAP and b) the day's volatility as measured by the standard deviation. The present trend determines my bias and thus whether I will favor longs or shorts. The SD tells me how much I should expect to pull out of the market when I trade. I don't want to lose either of those two pieces of info by restarting the VWAP computation.
- Yes of course. If you scalp you could start the VWAP anytime you want to have a quicky. This works well in non trending markets.
- No darrh, you are incorrect. The one std dev is for whatever the distribution is when you make the trade. It has nothing to do with the normal distribution. Again you still seem to be hung up on the idea that std deviations are defined in terms of the normal distribution only.

- You are partially correct here. Years of experience do make a difference in how well you trade. The best analogy is playing a musical instrument. I can teach you all the techniques for playing, but it takes years of practice to develop your own style and to be good at it.
My point of the market statistics threads was to teach you a technique for analyzing the data and how you might use it. But it will still take you years of experience to use it successfully and to develop your own style
- If I interpret what you are implying here, it is that since I compute the standard deviation about the mean symmetrically, that it suggests that the distribution is symmetric about the mean.
This is not the case. Keep in mind that the variance is a positive number by definition of the second moment, but that standard deviation is either positive or negative since it is the square root of the variance. The fact that the standard deviation can have either sign implies nothing about the shape of the distribution. Perhaps it's the word standard that you don't like, but that is the general usage for any distribution normal or not.

Thread5:

- Very good questions thrunner and good observation as well.
First let me clear up one poorly understood idea about the SD. Most traders think that 68.3% of the data falls within 1 SD and 95% falls within 2 SD. This is only true for the normal or gaussian distribution. For skewed data, that is data that deviates from normal behavior, the best estimate can be obtained using Chebysev's inequality, which states that no less than 50% of the data falls within 1.4 SD, and no less than 75% falls within 2 SD. No less than 89% falls within 3 SD. These numbers are quite a bit different than that for the normal distribution.

These numbers are of course lower limits. The exact values could be computed from the distribution function. But I don't think there is much to be gained knowing that say 55% of the data rather than 50% of the data fall within 1.4 SD.

Another important point which I stated as a theorem in the SD thread, is that for any arbitrary distribution, **computing the SD with respect to the VWAP yields the smallest SD possible**. What that means in practice is that if you compute the SD with respect to any other price (eg the 1st SD price), you will by the theorem get a larger value for the standard deviation. This implies yet a larger volatility at the 1st SD than it does at the VWAP.

These two pieces of information taken together suggest to me that getting to the second SD (computed with respect to the VWAP) is not all that unreasonable although of course with greater risk than trading at the VWAP. Getting to the 3rd SD however is problematic.

I will discuss in the next thread, about what to do when you take a trade at the 1st SD and the price action does move against you. There is still room for pulling a profit out of the trade.

- Good observation nelo. I was wondering when someone would see this. The point I will make here, is the old paradigm about choosing trades with a 2:1 or 3:1 reward/risk ratio with fixed stop losses for most traders results in a slow bleeding of their account. We are going to cover this topic in more detail in the next thread, coming soon.
- Probably the most important mind set that I had to overcome, was giving up the idea of fixed stoploss on every trade and substituting the idea of risk tolerance instead. It wasn't until I did that, that I became a profitable trader.
- My style is something that developed over many years. I was initially a strong proponent of classical technical analysis and traded futures and stocks for quite a number of years using classical methods. I oscillated back and forth between swing trading and daytrading, but was never satisfied with the results. Some years were profitable, other years were not. There was no consistency. I slowly came to the realization that classical technical analysis was not going to yield a consistent picture of market behavior. It was too heuristic. I wanted day to day consistency. I looked very carefully at market profile analysis. Realized that there was something there but it was woefully incomplete and in some cases just plain wrong. I wanted to be able to write my own software, but there were no good charting packages for doing that until Ensign software came along. Being a student of molecular simulation theory, I knew enough about statistics to realize that the logic of the market could be found in a proper statistical analysis of the data. That coupled with understanding risk tolerance and trade management is where I am today. My trading is now quite consistent and I am happy to say has become quite enjoyable. I am both a teacher and student. I've been both my whole life and I am happy to share with you what I've learned about market behavior. There is still much about market behavior that I don't know and learning about the markets will be a lifetime experience.
- There is actually no good way to back test something like this Dogpile, because the distribution function, the volatility and HUP distribution (Hold Up Price, which we haven't discussed yet) is constantly changing from day to day. What you will discover in the next thread, is a new paradigm about stop loss placement and trade management.
- Very good question, glad you asked. I'll phrase it differently. How large does the skew have to be to consider taking a trade at the VWAP or SD in the direction of the skew.
The answer is: I was concerned about this for a long time. It turns out, that there is no correlation between the size of the skew (as measured by the Karl Pearson definition of skew which is $(VWAP - PVP) / SD$) and the momentum of the trade in the skew direction. What only seems relevant is that a skew exist. Other HUPs will come into play between the entry point and the profit target which will play an important role in the momentum of the trade. We will discuss these in a later thread.

- Unfortunately not. It's the very nature of skewed distributions that the "tail" on one side is not the same as the tail on the other side. So a tail test just doesn't make much sense
- *what do you think of currency futures GBPUSD EURUSD; how suitable/appropriate is the market statistics method for trading them?*
- I don't trade these, but I see no reason why market statistics data could not be used for these, as long as volume data is available.
- It's not fixed in stone unicorn. The point of having high volume is two fold,
 - a) You want enough data to generate proper statistics
 - b) you want enough volume to provide liquidity, so you don't get caught with your pants down.
 36000 contracts traded/day would be about 5000 contracts/hour or 80 contracts/minute. That's not a lot of contracts.
- PVP refers to the peak volume price for the complete volume histogram. POC refers to the peak volume price (called Point of Control) for Market Profile, which is a 30 minute average of the volume histogram. Market Profile's POC will thus only show a slower variation of the peak volume price.
- VAH and VAL have no statistical significance. They are purely heuristic values based on a percentage of the volume data above and below the peak. The choice of that percentage was based on the incorrect assumption that the volume distribution is normal. It rarely is. The statistically valid values are the standard deviation of the data from the VWAP. For finite data, this is always definable regardless of the shape of the distribution.
- Risk is determined by what percentage of your capital you can afford to lose on each trade. This is typically 1 or 2 %. You can use the width of the SD bands to determine how far you can expect the market to move against you. If the bands are wider than your risk tolerance then you might not want to trade.
The more data of course the better the statistics. But this does not determine the width of the SD bands. It's the price action that does
- *Do some markets just tend to behave "better" due to other factors (persistence, more consistent volatility etc.)?*
- If by behaving better, you mean not jumping around a lot, I have no idea what determines that, but I really don't care. I just follow the statistics. It's the only thing that really matters. I've quoted this before from Nihabaashi: "To fear volatility is to fear profits"

Thread6:

- As far as risk/reward, think of it as how much does it really hurt if it only represents 2% of your entire account vs. how much you are hurting if you take multiple stoplosses. To get stopped out in the scenario that is described,

the market would have to move 3 SD without a rotation against the skew. You can avoid a chunk of that by not taking trades at the 2nd SD, expecting a move to the 3rd SD, not a high probability trade.

- Except for basic ideas concerning statistical analysis which you can find in wikipedia there are no books or reading material describing what I've posted in these threads as it relates to intraday trading. It's all new stuff that I've developed over the years. I thought it would be a good idea to present it somewhere. There is also a short description of where I'm coming from in [post 15717](#).
- You are quite correct here Dogpile. If a move from the VWAP gives the smallest SD (and thus lowest volatility), then trading at a price just above the VWAP (in the case of positive skew) should have higher volatility and should be a superior location for a trade in the direction of the skew. I thought to myself that this should be correct, but then realized that the probabilities for continuation in the skew direction is declining the further you move from the VWAP, which offsets the higher expected volatility. Exactly where the "balance point is" I don't know. I decided not to pursue this because there are other interferences which I call HUP which are virtually impossible to include in a more general computation. HUP will be discussed in a future thread
- You are correct here. The SD is a reference point rather than a point fixed in cement where you have to take a trade. When we discuss HUP in more detail in a later thread, you will see that more often than not, the entry for the trade is offset from the SD by the HUP. This can get quite complicated, so I don't want to get ahead of myself in a discussion of it here.
- Good question and good observation darth. Here's the problem. In a short, if price is already below the 1st SD, (or above the 1st SD in a long) the probability of it returning to the VWAP diminishes with every tick that it moves down. Thus if you expect to take a trade at all, you have to find another entry point, since price may never return to the VWAP. You could of course develop a trading style in which you only take VWAP trades, but you may have to wait a long time for an entry. The 1st SD is then the next best entry target.
- Yes, if you enter at the VWAP, scaling in becomes dangerous. At the PVP, other things can happen which we are going to cover in the next thread. Scaling-in there or at the next SD becomes a touchy situation, definitely not for newbies. Advance traders might do so, but can easily get caught with their pants down (as I did today, but I didn't lose my pants, only my shirt).
- Sorry Dogpile, but this is just plain wrong. The standard deviation computation IS the true volatility, for the distribution in question, no matter what the shape of it, normal or otherwise.
- No, 2 std devs doesn't mean anything different. It's just that most people exposed to statistics, have only seen the normal distribution and think the

whole world revolves around that (I guess that's why its called "normal"), so they think that 2 SD should always represents 95% of the data for any distribution. The normal distribution, however, is not the center of the statistical universe. There are more different types of distributions than you can count on both your fingers and toes. Academicians have been trying to pigeon hole the type of distribution that markets follow for years. The closest they've come is something called the Pereto-Levy distribution which I don't want to discuss here since it really doesn't have any practical significance for trading. The point is, no matter what the distribution function looks like, the standard deviation is computed in exactly the same way for all of them. How much of the data this represents will of course be different depending on the distributions shape.

- If you are thinking here that the VWAP is some psuedo mean then that's not correct. The VWAP IS the exact mean for the volume distribution. For any finite distribution of arbitrary shape, you can calculate the mean in exactly the same way
- Wrong on both counts. Skewed distributions are funky to you, because you are not used to them, but they have been around a lot longer than any of us have been on this planet.
And once again, the mean for a finite skewed distribution is well defined.

The VWAP is as mean as they get. lol

- good question cooter. yes price will reach the 3rd SD at times. This usually occurs on a fast momentum break out. In the last week there has been a lot of this. Extremely difficult to trade, if you didn't catch the move at the start. You don't want to enter a trade when price hits the 3rd SD. A rebound could catch you off guard.
- By entering a trade at the 3rd SD, I meant entering in the same direction as the breakout.
By fading it, you are doing a countertrend trade. This is also dangerous because you are trading against the skew. The breakout could just continue. We will discuss countertrend trades in the next thread.

And yes you should wait for a pull back to the 2nd or better the 1st SD and enter in the direction of the breakout.

- If you are going to use risk tolerance procedures to trade, you need a sufficiently large account so that 2% of it represents enough dollars to scale-in or reverse trades when necessary. Once you have computed your risk tolerance, you can then decide what instruments to trades based on their current SD. Personally, I wish I had known about risk tolerance years ago when I first started trading
- Well it's tough to answer your question Blowfish, because I haven't kept any data on every possible trade that could have been taken.
As far as getting stopped out, that is, my risk tolerance hit, it doesn't happen

that often, maybe once every couple of months (turns out it happened yesterday). Usually when it does happen, it's because I did something stupid, like scaling in too early, or not having my system stop in the right place, or not seeing something that I recognized after the fact.

Generally markets rotate daily many times, so there is ample opportunity to exit a trade after scale in. On trend days, you wouldn't scale in, but I think it would be pretty obvious. Trend days usually just creep up an SD with little or no rotation.

- Well first, I haven't defined a method as such. I've given you a tool from which you could develop your own method. Every trader using the volume distribution function will use it differently. So far I've shown you some basic entry and exit points, which you could incorporate into a style of trading.

Secondly, if you call yesterday a trend day for NQ, it worked pretty well, don't you think? I wouldn't have called yesterday a trend day for NQ, because there was considerable rotation from one SD to another. A trend day from my perspective is one with little rotation, ie, market just creeps up one of the SD curves all day long.

There is no preference for environment type as far as using statistical analysis like this to make a profit. What is more important is how you adjust your trading style to conform to the statistics for the day. You can make money (or lose it) on any type of day.

- If you want to do more advanced trades (which I only recommend once you have passed the basic test, lol), you will want the volume histogram and its VWAP, SD's for 1 day, 2 day, 1 week, 2 week, 1 month, 2 month and 1 year. You will also want these lines to update dynamically for the day you trade. We will get to what all this means when we discuss Hold Up Prices (HUP)

Thread7:

- *seems to me that each contract has its own nuances relative to VWAP. for example, the S&P futures really seem to react as you would expect around the VWAP price -- generally finds support or resistance there -- unless its a strong move -- whereas other contracts (NQ/YM) seem to violate the VWAP without the same regard for it. has this been something you have noticed?*
- I haven't investigated this in any detail Dogpile, but my feeling is that the nature of the instrument your trading shouldn't matter that much. As long as the statistics are valid, any violations of the VWAP or SD should occur in a random fashion. Use of the Shaprio Effect should help find those.
- *When using Shapiro Effect trading with the skew, how often have you seen prices breakout against the skew and stop you out, and how much wiggle room should one allow the market to have before you bail?*

- If you are afraid of using risk tolerance as a trading philosophy, then you need to have a nearby hard stop for your trade. If you entered short using the Shapiro Effect, then you entered below the low of a nearby up bar. Set the stop 1 tick above the high of that bar. Similarly for longs.
- If that's your risk tolerance, then by definition you are comfortable with it. If you are not comfortable with it, then you need to redefine a different risk tolerance.
- The number of ticks up where I would set a break-even stop depends on what I'm trading. For me a break-even stop is discretionary, it depends how the trade is going.
- I hope you are not thinking that I am giving you a method to trade, rather than a tool to use for understanding price action. The "method" will depend on your trading style. Exact entry, stoploss points, and profit targets will depend on your trading style which only you can develop for yourself. That being said, the stats for trading will be based on your trading style. If you know where and how I trade, then you know my stats. But my stats won't be anyone else's stats using the same tools.
- If you have to wonder whether the trade is any good, then you probably shouldn't have been in the trade in the first place. Before you enter a trade you must have all your ducks set up so you know exactly what you will do when the market decides to move against you.
- Yes, this is the problem with breakout trades against the skew in general. There can be several pseudo breakouts that fail. This is why they are so difficult to execute properly and why I don't like them.
- If you are using risk tolerance, then yes, wait for the market to retrace to the VWAP and scale-in. If risk-tolerance is not your cup of tea, then you have to set a hard stop and it might as well be the high of the entry bar.
- Correct, I use risk tolerance with scale-in rather than tight stops for trades in the skew direction. For break-out trades against the skew, I will use a break even stop quickly, but if I can't do that, I will put a stop just below the VWAP. There really is no good scale-in point.
- Probably not, but I haven't investigated this in any detail. When the real breakout occurs, there won't be any retrace. It just goes.
- You are correct bh_trade. PVP does jump around especially at the beginning of the day when the volume histogram is first developing. It's important to know the relation between PVP and VWAP in order to understand the price action. Hopefully these threads will help you understand how price action is connected to this relation.
- The simple answer to your question walter is yes. What complicates the answer however, is that the price action is in a region (low volume region) where a break out against the skew is very likely. Also, price action is on the

wrong side of the VWAP, so the trend is up. In addition, price action is above the PVP which acts as a HUP (Hold UP Price) for the short. So be cautious here. Use the Shapiro effect to enter the short, but bail out immediately if the SD is violated to the upside. Similarly for longs.

- Is there a distinction to be made between a)PVP moving to the price action and b) price action moving to the PVP.

My initial thinking about this was similar to yours. That if the PVP suddenly jumped to the price action, it was still trying to establish itself and hence the price action would continue in the same direction. But after seeing a lot of this type of behavior (that is, PVP jumping to the price action) and noting that sometimes it continued in the same direction and other times it would reverse, I've concluded that the best you can do if you want to trade in this region is wait for the break through an SD or VWAP before taking a trade. In some cases this means taking a trade in the same direction as the trend, in other cases it means taking a trade against the trend. Is it dangerous? Yes. That's why I've waited seven threads to talk about it.

As far as the stair stepping of the PVP goes, I think each stair step down say has to be considered on it's own merits. When the PVP drops from one point to a new point, you have to re-ask yourself the same question, is a reversal imminent. Will the price action take the market up and break out the nearest SD above the present price.

You can also do the following thought experiment. Suppose you walked into a room for the first time and you saw a monitor displaying a real time chart with the price action at the PVP. Is there anyway for you to tell without going back in time, whether the PVP jumped to that price action or the price action moved to the PVP? The answer is no. Until the price action breaks through the nearest SD, you really can't say much about which direction you would look for a trade.

Now compare that to walking into the same room and seeing the VWAP below the PVP and the price action below the VWAP. In this case you would know immediately which way to look for a trade

- This one is not a good idea. If you trade 2 at the 1st SD and price moves against you back to the VWAP, you are going to want to put 2 more contracts on, so that break even is a 50% retrace. If you put only 1 on, break even is a 67% retrace, leaving you hardly any profit potential back to the 1st SD. Which brings me to another point. If you are using risk tolerance as a trading philosophy, and you are comfortable trading only 4 contracts. Your initial entry better be 2 contracts or less. Do you understand why?
- Again if I am trading using risk tolerance, and 3 contracts is my limit, your only choice is 1 contract on, keep two in reserve. In this mode, if you enter 1 contract at 1st SD and market moves back to VWAP, you can put 2 more on and have break even at 33% retrace. That's usually a pretty good bet.
- At the open, you don't have any data for today. If I am not using any HUP from previous days (yet to be discussed), then I wait until the range of the bars is smaller than 1 SD, before considering any trades. This of course means I miss all that great action at the beginning when the market takes off

in one direction or oscillates rapidly. So be it. We will talk about trading at the HUP on the open in an up coming thread.

- I realize that breakouts can be touchy trades, but try using the Shapiro effect to trade the breakouts (see [post 16541](#)). Sometimes there will be a retrace and you will be able to catch this trade for a big move.
- Glad you find the statistics useful Dogpile. As far as the Shapiro Effect is concerned, it's not a pattern in the usual sense of patterns as defined by Bulkowski, but rather a simple statement of implied market direction. The breaking of a high/low is just my interpretation. You can use any other wait period of your own choosing.
- To answer your question, breakout trades are dangerous to take under any circumstances. As you indicated, you noticed four bars back, price action broke out above the 1st SD and then failed to continue. Second breakout could have failed also. Tough call. I usually don't take breakouts. But if I do, I will move my stop to breakeven quickly.
- When two humps form in the volume distribution, watch carefully. The peak in the second hump may become the new PVP. At that point in time, the character of the price action can change abruptly. If I am in a trade when that happens, I will usually exit.
- I discussed this in the first post of this thread. It doesn't matter where the PVP is located(between SD and VWAP or between two SD's), the result is the same.
You have three choices:
a) do nothing. If you are novice this is what you do.
b)play the oscillations between the two SD's. This is what you do if you are a scalper
c)Wait for a breakout out of the PVP zone(the regions between the 2 SD's)

As I indicated in the first post, this is a difficult trading region, but can be very profitable if you get it right.

- *Is there anything that might tip you off that price might be heading back to the PVP?? on this chart I think not, maybe the last few days or last weeks stats or other HUPs might have held clues.*
- You are correct. From this chart alone there is nothing that would tip you off about a short failure. Which is why I introduced the concept of HUP. If there were a HUP just below the short entry, you might have passed up the short trade.
- *If price finds it's way back to the VWAP and you already have a contract on from SD1 would you use the shapiro effect at the VWAP? I might be inclined just to pull the trigger. If price zooms through as it did here would you be inclined to think OK we are done with this trade lets close it out?*
- Here is where trade management becomes important. If you were a NEWBIE, you most likely would set a stop at the VWAP and be stopped out.

If you were a more advanced trader, you might pull the trigger at the VWAP and enter a second contract short PROVIDED doing so was still within your risk tolerance.

The other scenario and one that I have never discussed but probably should have is as follows:

You enter the short trade based on the Shapiro effect. But then the trade starts to fail. If price moves above the high of your entry bar, reverse the trade and go long. A very aggressive trader would not only do this but also increase size.

Keep in mind all of this is possible PROVIDED you are within your risk tolerance.

You can see how using risk tolerance rather than stoplosses gives the trader considerably more flexibility.

- *There is another difficulty with averaging in (apart from accepting the risk) and that is psychological. If I already have a position and that is short I find that this can give a 'bias'. Actually the bias is justified probably as the skew is in our favour ($VWAP < PVP$) and the trend is in our favour ($Price < VWAP$) furthermore we have a plan to add 1 contract at the VWAP.*
- Yes, the psychological aspect of the trade is one that is difficult to control. Everything seems to be in your favor for the short, and your emotions tell you that this trade can't be wrong.
In fact you must think differently. When you enter the short, the first thing that you must do is decide exactly what you will do if the trade moves against you. Will you wait for the price action to move to the VWAP? Will you reverse the trade? Will you increase size?
The easiest thing to do is set a stoploss and forget about it. In my opinion this will never lead to profits.
Active management is the key to a successful outcome of every trade.

Thread8:

- *Your definition of trend is price in relationship to the VWAP.*

Price above VWAP the trend is bullish
Price below VWAP the trend is bearish
- This is correct as defined in [Part II](#)
- *PVP in relationship to the VWAP tells you what kind of distribution you are looking at.*

VWAP above the PVP tells you we are currently in a positively skewed distribution to the long side
VWAP below the PVP tells you we are currently in a negatively skewed distribution to the short side
VWAP close to the PVP tells you we are currently in a symmetric distribution.
- Yes, this is also correct

- *If the above statements are correct, I have a couple of questions.*
 - 1) *My thinking is that skewed distributions tend to indicate trend movements and symmetric distributions tend to indicate reversions to the mean or a congestion type of environment. This is of course only relevant to the current situation as the VWAP and PVP relationship can change in the future.*
- This is approximately correct. You can get reversion to the mean in any environment including a skewed environment. In a skewed environment you would look for a trade at the VWAP. In a non skewed symmetric environment, do nothing at the VWAP.
- 2) *It would make sense to me that overall bias (whether you want to take long trades only or short trades only) would be determined by the VWAP/PVP relationship. Assuming that looking at the volume histogram gives you a pretty good idea that the current bias is not going to change soon:*
- Almost but not quite. You have to know where the price action is relative to the VWAP and PVP. For example for a positive skew your bias is long provided price action is above the VWAP. If price action is at or near the PVP, even if the skew is positive you don't have a bias until the breakout occurs.
- *If the VWAP is above PVP you should only be looking for longs (assuming that current bias stays the same). This is regardless of location of price. If price is above VWAP you are trading with trend. If price is below VWAP you are trading counter trend.*
- This is incorrect. Look for longs only when the price action is above the VWAP. Below the VWAP, wait for the price to move above and retrace before taking a long. Otherwise wait for the break out at the SD below the PVP and go short.
- *B) If the VWAP is below PVP you should only be looking for shorts (assuming that current bias stays the same). This is regardless of location of price. If price is above VWAP you are trading counter trend. If the price is below VWAP you are trading with the trend.*
- Also incorrect as mentioned above. You trade short if price is below the VWAP, otherwise wait for a breakout.
You might want to reread [Part VII](#) concerning break out trades.
- *C) If the VWAP/PVP is close it is a big assumption that current bias stays the same unless price moves rapidly back towards the VWAP.*
- Don't know what you mean by current bias. If the skew is close to zero, there is no bias.

- *So when in a symmetric distribution it seems to make sense to me that you would only trade at 2nd and 3rd SD's for safety reasons in expectation of a move back to VWAP. However, it must move quick or you will not continue to have VWAP/PVP close (symmetric distribution).*
- Well this depends on your trading style. In a symmetric distribution you have a dilemma, in that you don't know how long the symmetry will last. This means you could take a trade at any of the SD's either long or short. In one case you would be trading countertrend, the other with the trend. That's why this is not for newbies. Using something like the Shapiro Effect will help.
- *Given the above, the first trade on the YM does not make sense to me. We are in a symmetric distribution, why short at the 1SD below VWAP expecting a move to 2SD. If you expect the symmetric distribution to hold, then you are not trading with that expectation. It is more probably to get a move back to VWAP and other side of distribution, then to extend further against the VWAP toward 2SD and 3SD. The only exception would be if you are expecting the VWAP to continue down below the PVP and quickly turn into a negative skew*
- I think you meant the NQ video, the first video was a YM long. In any case the first NQ trade was a legitimate breakout trade into the low volume zone. It doesn't matter how close the VWAP is to the PVP, only that price action is in the PVP zone. Dangerous? yes, but nevertheless workable.
- *3) Trading a symmetric distribution (assuming it holds) at the 2nd and 3rd SD's with the expectation of a QUICK move back to the PVP or other side of the distribution. It does not make sense to me to take trades at the 1SD with the expectation of a further move away from PVP in this type of distribution. If you are expecting a skew to appear...seems it would be better to wait for the skew then take this type of trade.*
- Again, this will depend on your trading style. An advanced trader would take the trade if he thinks the VWAP is going to continue on down. Why miss the opportunity? If the Shapiro effect indicated the price action is going to continue down, pull the trigger.
- *Now if you are trading for a reversion to the mean at 2nd SD with the expectation of a move back to PVP or other side of distribution then risk tolerance doesn't make as much sense to me because the move is going to have to happen quickly because skew will appear if it stays out there and especially if it starts to move against you out towards the 3rd SD. Then you are going to have to exit (can't reverse positions in between 2nd and 3rd SD I wouldn't think. So I would think you would want to use a tight stop not risk tolerance.*
- Yes, I would agree with this interpretation. You would either exit the trade at a hard stop if the trade moved against you, or possibly reverse the trade for a further move down depending on how far below the 2nd SD you did the reversal.

- One more question....

The VWAP/PVP relationship determines the type of distribution (skewed/symmetric). Ignoring for the moment that as price moves around and volume trades that the VWAP and PVP change and the distribution will probably change. Let's just say we were pretty sure that the type of distribution was not going to change for the next hour.

The point I am trying to clear up is that price in relationship to VWAP determines trend. I don't think it does. I think the distribution function itself tells you the trend bias and strength based on the strength of the skew. Who cares where prices are in relationship to the VWAP. I am thinking in terms of statistics and occurrences in relationship to the distribution function.

- You are quite correct for **static** distribution functions. Note the emphasis on the word static. If you knew the distribution function in advance, you would know exactly how to trade it.
As you correctly point out, if the distribution had positive skew, you would go long every time the price action dropped below the PVP and vice versa for negative skew. Similarly for no skew distribution, always trade toward the VWAP. This is the classical reversion to the mean theory.
The problem as you realize, is that in a real market, the distribution function is **dynamic**. Note the emphasis on the word dynamic. Reversion to the mean, does not necessarily occur. Price action itself renormalizes the distribution as more prices are added to the time series. As a consequence, the relation of the price action to the VWAP and PVP becomes critical in choosing trade direction. Trading AWAY from the VWAP then becomes the more likely scenario. Trading TOWARD the VWAP is then relegated to symmetric distributions, which is the classical case.
Trading away from the VWAP then defines the trend (if in fact you want or need a definition) as UP when the price action is above the VWAP and DOWN when the price action is below the VWAP. This definition breaks down of course when the distribution passes through the symmetric state. At that point there is no trend.
- If the price action stays below the VWAP and breaks out below the 1st SD, then the bias would be down. But until that happens, all you will get are oscillations between the VWAP and the 1st SD below it. See the breakout thread [Part VII](#) for further clarification
- Symmetric distributions ($PVP \approx VWAP$) are tough to trade especially when you have multiple peaks as in the example you show. My initial reaction would be to let it pass.

Thread9:

- *Back in the newbie days when things where nice and simple the way I understood it was you would enter at the VWAP with a stop at the PVP? (or was it a couple of ticks the other side perhaps?).*
- Yes. Simple trade simple stop. Only 1 complication. Profit target was arbitrary
- *You then introduced us to SD's With options of taking a trade there. At this time the stop would still be the PVP with the option of adding to your position at the VWAP. In fact a Whole section was devoted to risk tolerance. Again if I understand this correctly we decide what the maximum amount is we are ever to risk (based on account size) and then use market statistics (VWAP,SD) to enter and the PVP for a stop?*
- Correct. Still reasonably straight forward. I probably should have introduced the Shapiro Effect at this time to help eliminate bad entries.
- *All well and good to this point however when you introduced breakout trades and counter trend trades I think a couple of different styles of trade management where also introduced. With BO's you would move the stop to BE as soon as possible? As an aside because BO's break and go you would consider entering these aggressively without waiting for the Shapiro effect? Also the way I understand it you would only do this at a BO of the SD band. A BO through the VWAP would be managed normally?*
- Yes this is essentially correct. Break outs are difficult to trade under any circumstances. It's still possible to use the Shapiro Effect if you get a retrace. If not, tough luck.
- *With countertrend trades (symmetric distribution) you offer a couple of choices for stops - add 1 at the SD2 for a return to SD. -or- Stop and reverse if your trade moves against you for a journey to SD2 (I guess you are switching from counter trend to BO) Does this sound correct? Things are certainly a bit more complex than when newbie started out!*
- Correct again. As you are seeing, the trade threads get more and more complicated and more difficult to manage. This does not mean you have to expose yourself to these more difficult trade setups, but you should be aware they exist
- *One other thing you mentioned briefly (can't remember where) I seem to recall you mentioning those with low risk tolerance could put the stop behind the Shapiro bar? Maybe I dreamt that.*
- I did say that, for those who feel queasy about risk tolerance trading.
- *I also recall you saying you where 'conservative'. I wonder how you reconcile that with wide action points (I hesitate to use the word stops) particularly those introduced for 'newbie'? Especially in light of the paragraph that follows :-*

- Not sure what you mean by wide action points. If you are referring to days when the SD is very large, don't trade those days if the SD is near your risk tolerance. (We have had a bunch of those lately)
- *Another thing about the Shapiro effect - if the trigger bar (the bar that touches the band) is of a wide range, we can end up giving away a lot of potential profit and adding to our risk (as your stop must be further). For example for a short at the VWAP if the bar comes from halfway between the SD1 & VWAP we give up half the potential profit and our stop is correspondingly further away while we wait for the low of this bar to be broken. Do you pass those trades or maybe not use Shapiro, or maybe drop down a timeframe for a more precise entry?*
- The Shapiro effect is a two edged sword. You don't get something for nothing here. If you use it, as you point out, you will decrease your profit potential and increase your risk. And yes, you can drop down a time frame to find a better entry point.

Sounds like you've got the statistics down pat, NICK. Now all you have to do is trade it and see how it works out for you.

- *I took a stab at fixing the program bugs that stopped my tick chart from displaying correctly, and during the evening I replayed intraday charts using both tick charts and chart with 5 min candles. What I observe is that one can use the tick charts to trade the pre-open and open (first 30 to 45 minutes), watching the market develop and taking a few quick scalps. You can then "switch over" to the longer term chart (2-5 minute candles in my case) and not feel as though you "missed" the open..Just a thought.*
- Yes Steve, that's one way to trade the open. I usually use a 15 second chart on the open and watch to see if there is a NEWBIE entry for a quicky.
- The break out trades occur when price action is near the PVP Nick. If you have the situation where the PVP is also near the VWAP at the same time, you do nothing. Just sit and watch.
- Otto--the Shapiro Effect doesn't say anything about which bars to use. But here is what I do:
Long
The last down bar that touches the SD is your test bar. Doesn't matter where or how it touches.
Entry bar: The first up bar with any price higher than the high of the test bar, pull the trigger

The simplest situation would be 1 down bar touches SD. Next bar has a price higher than the high of that down bar.

More complex situations would be several down bars touching SD. Next up bar does not have a price higher than the last down bar high. But the one after that does. Pull the trigger on that second up bar.

It is also possible that your entry bar which looks like it is going to be an up

bar and you pull the trigger long, eventually turns out to be another down bar. Tough luck.

Thread10:

- The only tools I use to get ready for today's trading are the HUP lines from previous trading days, weeks, month and year. I don't use anything else. These are my support/resistance lines that will keep me in a trade or tell me to exit
- Other than putting the HUP lines on my chart, I don't do anything else to begin the day. I just follow the statistics and what the price action tells me. I will be cautious around key economic events that usually come out around 10:00 EST, but other than that there is nothing else that I do premarket.
- Yesterdays distribution would always be more important than today's, early in the trading day during the period when today's distribution is still developing. If there is rapid price action early in the day, today's price action is not going to help you much. You can tell this by comparing the range of each bar to the standard deviation. When the bar range is the same size as the SD, you can't tell much by looking at today's statistics. So you either have to go to a faster time scale, or use a distribution that has developed over 1 or more days such that the SD is larger than the bars range.
- I was wondering how long it would take for someone to see this. Congratulations Unicorn, you are an astute observer. If you are a NEWBIE trader, and you see a contradiction, you of course do nothing.

An advanced trader however would look at the VWAP's and SD's from various days as a series of HUP's (read the HUP thread to see what this is). The HUP lines are then treated as simply support/resistance lines. Decision to enter a trade would then depend on several factors:

- a) The separation of the HUP's----is there enough open space for a trade or are they close together for just a quick scalp
- b) The placement of the HUP's in case scale in would be necessary
- c) is the HUP below a VWAP or above it?
- d) Am I looking for a reversal or a continuation at the HUP?
- e) Can I use the Shapiro effect for entry?

As you can see there are numerous things to consider, but after you practice this for a while, it becomes second nature. Sort of like learning to play an instrument.

Thread11:

- I start my VWAP computation for today at the 9:30 open. But even if you start it at the beginning of the overnight session, it usually won't make much difference. Remember, VWAP is volume weighted and there is not much volume overnight compared to the 9:30 open.
- Occasionally, I will enter a trade premarket open using VWAP data from the previous day, but not too often.
- If you think of the HUP lines as pivot points, you will understand what I am referring to in the previous threads.
For example suppose you are thinking about entering a short trade at the 1st SD below the VWAP. As the price action approaches the 1st SD from below, you notice there is a HUP point just below the SD. What do you do? It would seem to me the only thing you should do is pull the short trigger at the HUP rather than wait to see if the SD is touched.
Similarly on trade exit. If you enter a long trade say at the VWAP with the intent of exiting at the 1st SD, but you notice there is a HUP line just below the SD, you should exit your trade at the HUP or at least remove some contracts at the HUP rather than wait to see if the SD will be touched.
These are just two examples that I use every day.
There is a rich variety of other things you can do at HUP lines, but I will leave it to you to discover these on your own.
- If you are asking, do I include previous PVP's as dynamic HUP, the answer is yes. In fact, if I see price action approaching a PVP, I will just stand aside and not trade there. If I am already in a trade and price action approaches a PVP I will usually exit there. As far as the PVP's being virgin or not, I don't make a distinction between virgin or non virgin ones.
- Ofer, what's presented here in these threads is not a "method", but a way of viewing the price and volume distribution. No matter how many traders looked at the volume distribution, the distribution would still be valid, since it represents the statistics of all trades that have taken place. There would still be a PVP, a VWAP and a SD. How you use that information is highly personal depending on your trading style and objectives
- *I am also curious to hear if this can be used effectively for Forex because getting the actual traded volume for Forex is at best very difficult and the correct VWAP completely relies on accurate volume data.*
- If you don't have volume for forex, you can still use the price distribution function and generate an average price instead of a volume weighted average price. Should work ok.
- You don't need a trend day for market statistics to "work". Whatever the day is, market statistics will reveal it by the shape of the volume distribution function. How you use this information will be different for different traders.
- *Thank you for a lovely discussion, Jperl. I find a lot of validity and usefulness to your methods. I do have one question, though. Since the skew of the volume distribution is such an important part of your analysis, why not use other methods for estimating it. Rather than rely on the position of the mode*

so much, one could use the median or better yet, compute it in the classical way as the third moment of the volume distribution. The reason I ask is that a lot of times in the markets we have the PVP but also another price with almost as much volume. Also, sometimes there are clusters of volume that don't necessarily include the PVP but could also act as a HUP. The point I am trying to make is that the relative position of the PVP and the VWAP is not always a reasonable estimate for the actual volume distribution skew and I was wondering if you have looked into it.

- You are perfectly correct, that the exact definition of the skew requires a computation of the 3rd moment. The problem with it is the computation is very cpu intensive. I therefore settled for the approximate value due to Pearson as discussed in the skew tag. The advantage of this is you can visualize the skew just by looking at the volume histogram with the vwap superimposed. The problem is as you point out, when you have two large volume peaks, you don't quite know what the skew is. Nevertheless since you can visualize the volume peaks in relation to the VWAP you can approach the market with caution when this occurs.

As far as HUPS go, you are correct again that peaks in the volume distribution are HUPS. Which HUPS you wish to use in your trading is of course a function of your trading style. Keep in mind that HUPS are just that, hold up prices. They are places for you to be cautious as to what to expect.

- *First let me thank you for these amazing threads, being a newbie I find them very useful. Second I apologize for my poor English. Now to the computation of the third central moment. I am not educated in statistics, so I needed to read a few articles in Wikipedia. So please correct me if I am wrong:*

$CM3 = \sum (PROBi * (Pi - VWAP)^3),$
where

i is going through all prices in range (i.e. all rows in Volume Distribution Function)

CM3 ... the 3rd Central Moment

PROBi = Vi / V ... ith price probability (Volume per ith price / Total Volume)

Pi ... ith price in the Vol. Dist. function

Then the Skew would be calculated as

Skew = CM3 / SD³

*If this is correct, the computation doesn't seem too CPU intensive to me. I programmed such a computation in AmiBroker and I plotted a line on a chart. The line is VWAP + (Skew * SD). Watching this line together with PVP-to-VWAP relation can be very useful. Now I don't have time to elaborate, but if somebody is interested I can write more later.*

- Very good Ondrej. You have the skew computation properly weighted. What makes this computation cpu intensive is in real time you have to update the value of PROBi as you add more volume data. Should be okay for a fast machine.

Perhaps you can show us some charts with your skew computation drawn in along with the VWAP and PVP.

- Ok, I uploaded screenshots. These are 2min charts for ES for the last 3 business days, counting today. VWAP is the thick yellow line, PVP thick turquoise line, Skew Line ($VWAP + Skew * SD$) is the thin light blue line. The dark blue area is the area between the 1st SD's, the Value Area in terminology of MP.
If the Skew Line is above VWAP the skew is positive, below VWAP negative. The distance between the Skew Line and VWAP tells you how large is the skew compared to SD. To distinguish the two different methods to determine the skew, I will use terms $Skew(PVP)$ and $Skew(3CM)$.*

While $Skew(PVP)$ flips (or jumps), the $Skew(3CM)$ is continuous. By the time $Skew(PVP)$ flips the $Skew(3CM)$ Line crosses VWAP, that means $Skew(3CM)$ crosses zero. In other words, if the skew is positive and price action is above VWAP, $Skew(PVP)$ rises while $Skew(3CM)$ decreases. By the time the $Skew(PVP)$ flips, the $Skew(VWAP)$ crosses zero.

Hence the first use of the $Skew(3CM)$ is to warn you before the PVP flip. Another use, surprisingly, :) is to determine the real statistical skew. The $Skew(PVP)$ has the greatest absolute value right before the flip. That might lead you into some bad trades. If you look at $Skew(3CM)$ you will recognize that the real skew is very small.

As you can see from the charts, it looks like the Skew Line is a minor HUP itself. But I have been watching this only for a couple of days, so I don't want to make any conclusions yet.

- Nice job Ondrej. It looks as if using the exact definition of the skew can provide some useful trading information not available in the approximate Pearson evaluation.*
- The difference you are seeing in the PVP is most likely due to two peaks with almost the same volume. This will cause the PVP values to jump around from one time frame to another. This is an example where a visual of the total histogram would help you out.*
- Asume you have an i -loop going through all bars since the start of the examination period.*

For each i you need to do the following:

1. You need to determine Volume per price (the volume distribution function). Lets say you will have an array VD , where $VD[j]$ will be volume per j -th price. This VD array will change for every bar (every i).

2. You need to go through this array in a j -loop and calculate the following:

a) Probability of j -th price: $Prob[j] = VD[j] / TotalVolume[i]$. $TotalVolume[i]$ is the cumulative volume since the start of the examination period.

b) You need to calculate the 3rd central moment for every bar (every i). You again need to do it in a j -loop.

$CM3[i] = \text{sum} ((Price[j] - VWAP[i])^3)$. The sum goes through all j 's.

c) You calculate the $Skew[i] = CM3[i] / SD[i]^3$. This you don't have to do in a j -loop.

The j -loops don't have to be separate, you can do everything in two. I use three j -loops for every i . In the first one I determine the VD. I do this in a separate loop because I don't go through all j 's but only through those representing the actual bar. To VD array I add volume cumulatively from the start of the examination, so I don't need to recalculate it whole every bar, I need only to add the current bar volume to it.

The second loop I use for VWAP calculation and in this one I need to go through all prices.

The third j -loop I use for Prob and CM3 calculation and in this one I need to go through all prices. For this calculation I must know VWAP, so I cannot integrate the first and second loop. But if your software calculates VWAP for you and you don't need to calculate VWAP yourself, you can use only 2 loops.

- Don't trade at the VWAP if VWAP is close to the PVP. Skew is usually small at that point, so market doesn't know which way it wants to go.

Fading the second SD is ok, provided price has already passed through it and is coming back toward the VWAP. For example, if price is rising toward +SD2, wait for it to pass through it and then comes back down through it a second time before fading it. You may miss a few good trades this way, but at least you won't be caught in a continued range expansion to the upside.

- No. I would never fade the 1st SD (that is trade toward the VWAP). You are trading against the trend. Always dangerous at the 1st SD.
- When you scale in do you use the Shapiro effect or do you pull the trigger when then price hits the scale in point.
- Sorry for the delay in answering your query. I just noticed it.
As a newbie if you are using the Shapiro effect, you should use it on every entry. That includes scale ins as well. The whole idea behind the Shapiro effect is to give you confidence that the trade will move in your direction.
- 2.) Could you give some thoughts on when you reverse a trade. When do you do it?
- I was going to discuss trade reversals in the Market Statistics threads, but never got around to it. At some point perhaps I will add a thread about this. Basically, if you are in a trade and the trade begins to fail, you have 3 choices: a) exit at some predefined stop loss b) wait for a scale in point or c) reverse the trade. I've already discussed a) and b). Here is a simple procedure to do c): Wait for a scale in point and apply the Shapiro effect. If the Shapiro effect does not materialize, reverse the trade and double up on

the number of contracts you are trading. The whole idea here is you want the trade to be profitable and you want it to be so, quickly.

- *Glad to see you are still around Jerry. An idea for c) above. If whilst waiting for the Shapiro effect the other end of the trigger bar is broken, reverse.*