Nostalgic past? The trading pit of the Chicago Board of Trade

Where has the open gone?

Arthur Maddock, CEO of Portara, discusses the case for intraday data in a post-pit era

Over the years I have heard many CTAs and professional traders air their views about 24-hour trading. To most, the transition from pit to electronic in futures and commodities has been music to their trading ears. The perception of lower commission rates, the reduction of slippage and skid associated with a much welcomed paradigm shift away from the old to the new has been industry-compelling.

Another reason to rejoice in such a change is the potential diversification to a fund manager's portfolio that a major jump in liquidity may have; developing improved opportunity around the globe, opening up exchanges and markets that simply weren't there a few years before. It is quite obvious today that electronic, 24-hour trading is here to stay. Pit trading is a dinosaur and is part of a nostalgic past.

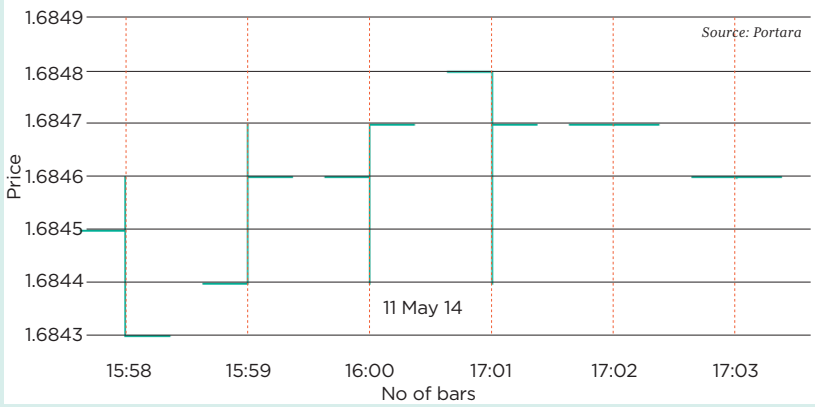
But as with any positive change introduced into a financial market, it may be accompanied by an underlying negative impact that is often difficult to track until later. All economic practice and social human nature works in the same manner. Fixing a problem and improving it in one area causes a different set of problems to appear elsewhere. We all know that, don't we?

As a number-nerd, I've always thought that price was such a beautiful and simple construct to ascribe to all market participants. To indulge in the visuals of prices on charts, of system overlays, Bollinger Bands and the like; the colours, the resolution and the attention to detail has been a grand data and information revolution. As next-generation chart applications have superseded their predecessors in every way, they have become a form of technical eye candy.

But by stripping everything back to its raw form and looking solely at the underlying data, what seemed at the beginning of my journey to be an easy task, to capture price action and to make money from it, has been a walk of more than 42 roads and half a lifetime's work. If you don't wise up to the potential dangers that 24-hour trading has created then you are at risk of a spanking, and of losing lots of money.

FIGURE 1: BRITISH POUND AT 1700H OPEN

Open: 1.6848 High: 1.6848 Low: 1.6844 Close: 1.6847 Contract: BPA201406 Date: 11 May 2014 Time: 17:01



Technical significance and robustness testing

When robustness testing and stress testing your technical system rules, the primary construct is to look for what is significant and exploitable on the one hand, by referencing the data. The second construct to consider is what system variables you are utilising to capture those events and to determine what amongst those variables are the most sensitive to changes when applied to that data.

There is an inherent disconnect between questioning the data and questioning the framework in equal proportion

As we all should know as CROs, CCOs and traders making decisions on this stuff, we try to guide our ship away from running aground with the curve fit, which ticks many of the mitigation of risk checkboxes in our trade risk management profiles. But the first critical observation with these two points is the disproportionate weight that many CTAs and traders apply to them. A 5%/95% ratio is not uncommon. "That's the data there, but look at the massive amount of work we have done on our system rules." Unfortunately this approach is not uncommon. What is clear is there is an inherent disconnect between questioning the data and questioning the framework in equal proportion.

Where has the open gone?

For Epictetus, one of the great classical stoic philosophers, a sage is immune to misfortune "because virtue is sufficient for happiness". But in the trading game everyone is prone to misfortune at all times, virtue and happiness have nothing at all to do with it and ultimately no one is a sage. The only certainty is the relationship you have with your data supplier or your 'data bank'. What is a virtue here, paraphrasing Epictetus, is that if you have failed to open an account at the right branch, you are already in bed with the wishing crew. The data bank is the kingmaker, who demands a high price of access, who never courts fools and whose trifles are the equivocation of reason.

If we look at the psychology of markets, we know that prices crystalise as a result of human interaction and perceptions. And where Epictetus gets it right is when he says "Man is disturbed not by things but by the view he takes of them". This is true in markets. Consider an old school trader with a hugely profitable long position in British Pound at the Friday close. Psychologically, Friday and Saturday are sleep-easy nights for him but by Sunday evening he's wondering what's about to happen on the open in the morning. And he doesn't sleep so easy on the Sunday night. Will price crash and will he exit his position first thing, or will price continue up where he may be thinking of adding to his position? One thing is for sure: because of psychological inferences such as this, around the open it's going to be volatile. Looking from a macro perspective at every other participant's hopes, fears, desires and needs at that point in time creates an Epictetus 'pool of views' or a Huxley 'Door of Perception', which reduced to its lowest common factor simply means there are clusters of traders interacting around significant (perceived) price points.

Back in the nostalgic good-old British Pound pit days, the 0720h open was volatile for reasons explained above. But has the 24-hour creep into financial markets upset the applecart for traders, and diluted the open's significance in any way?

The open price as reported for BPA (British Pound All Sessions) from the CME on Monday 12 May 2014 was at 1.6848.

However, this reported open is the open from the prior day at 1700h on the Sunday. No, I'm not making this up. This is the open that all standard daily data suppliers report and the open that many traders use to back-test with, regardless of considering the sensitivity that their systems might have to it. The chart (*above, figure 1*) shows

FIGURE 2: BRITISH POUND NIGHT SESSION

Open: 1.6876 High: 1.6877 Low: 1.6875 Close: 1.6876 Contract: BPA201406 Date: 12 May 2014 Time: 07:21

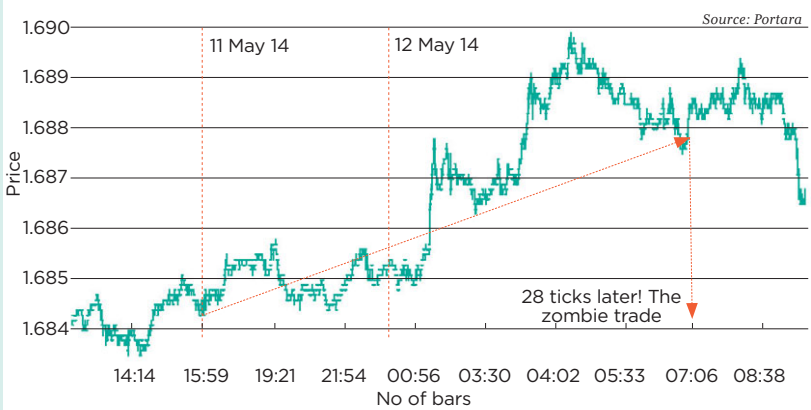
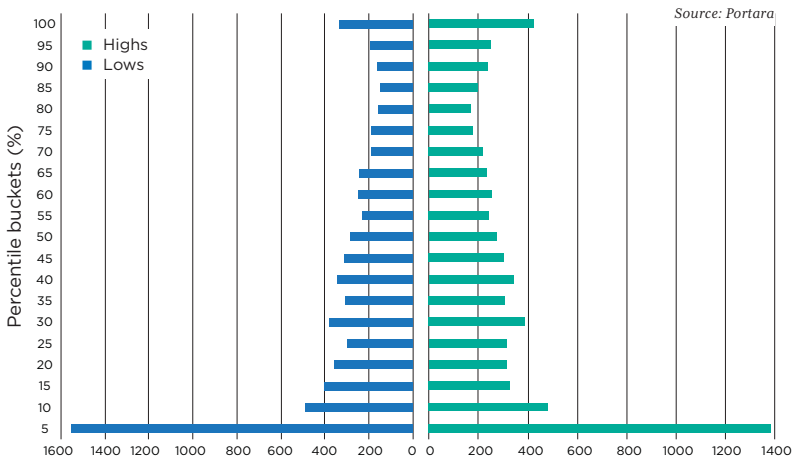


FIGURE 3: BRITISH POUND STATISTICAL ANALYSIS - HIGH/LOW (0720H TO 1400H, JAN 1980 TO MAY 2014)



the one minute chart of BPA at the session open of 1700h on Sunday 11 May confirming the CME open.

The second chart (*below left, figure 2*) shows an upward trend through the night session to the old legacy pit hours of 0720h the following morning which shows the price to be 1.6876 (28 ticks different). It doesn't take a rocket scientist to figure out that the compounding effects of this to a system sensitive to this type of issue may be analogous to a "Houston we may have a problem" stiff-upper-lip major understatement.

So what has the open at 1700h on a Sunday got anything whatsoever to do with what's going on at the start of play on a Monday morning? If you are looking at standard daily bars to make your trading decisions then you may prone to bleeding away slowly – a victim of underperformance or worse and you may not even be aware of it. You need to meditate on the points made earlier on and think seriously about a trip to the data bank to open a 'high returns' account. Further, if you do have access to intraday data, make sure you can chop off the evening and night sessions to be able to create your daily bars.

There's a new buzz in town known as "Regular Trading Hours" data or RTH. This simply means creating intraday and daily bars by constructing them from an intraday database. In one sense, there lies the rub, daily OHLC RTH bars must be constructed from an intraday database. There's no way around that folks! This way you can have your four data points OHLC anywhere you want it for testing and trading purposes. The problem is only a handful of real-time feeds supply it. But the real issue is trying to get it from a historical perspective. Intraday data is notoriously expensive and this type of product is like finding hen's teeth.

A ponderous affair

Some $64,000 questions and potential answers that need some soul searching are:

1. Is my system sensitive to this type of issue?
   As an example, you may be a position trader with a one to two day hold running a volatility-off-the-open or similar methodology as one of your systems. It should be pretty obvious that you are very prone to this issue. You need to ask yourself: why you are using standard daily data to do your testing and think again?
2. Well, where has the open gone? Is it still as sensitive around the old pit hours as it used to be, in this case at 0720h? Or has that been ironed out into an insignificant nothingness? Perhaps the open may have absconded elsewhere in the trading day, perhaps 0900h is the optimal place based on liquidity and a different type of trader mentality? Perhaps I'm not vulnerable to the issue at all, you may be wondering?

You may be surprised by the results. Remember the psychology of traders touched upon earlier? It's a fact that people do need to sleep. Also, many traders tend to opt out the night sessions completely and start again in the morning. To some traders there's something inherently good about not being "in" during the wee hours. Maybe it's the propensity for human nature to desire a restful state?

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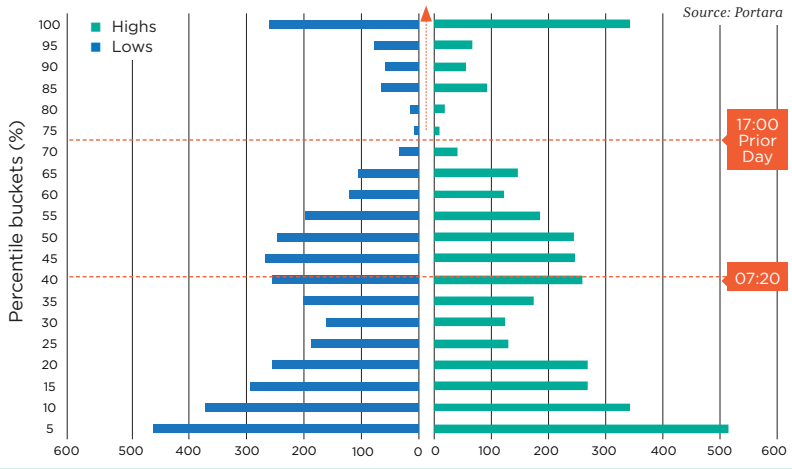
Of course there are stops to consider and the night-owl crew. But in general liquidity reduces during those hours. The phenomena, however, of trader cluster, volume and liquidity spikes around the old pit legacy times is as strong today as it's always been. After firing up Visual Studio and creating a C# app to demonstrate this clustering effect around legacy pit opens and closes, the results are pretty compelling.

The third chart (*above left, figure 3*) shows BPA clipped to remove the evening and night sessions back to inception on a one minute continuous back-adjusted ASCII file, a RTH one minute stream. This is the input. Next, I analysed that data on every single day and split the 400 minutes (from 0720h-1400h) into 5% buckets, 20 of them. I then simply said if the high of the day was made between the bucket times increment a variable to remember the setting for that bucket. I did the same with the lows.

If there was no significance around any particular 20 minute time slot (from 0720h-1400h) you would expect a fairly flat picture and as we analysed 6,716 days back to 1980 you would expect the map to display around 335 highs and lows per 5% bucket-row. But that's not the case. The map quite clearly shows a massive spike in the first 20 minutes from 0720h where the high or low of the

FIGURE 4: BRITISH POUND STATISTICAL ANALYSIS - HIGH/LOW (1700H TO 1400H, JAN 2000 TO MAY 2014)



trading day has a propensity to be set. Notice it is smaller on the close around 1340h-1400h but it is still significant. Time slots between those values display a flatter tendency.

So, in conclusion to the first test using the RTH one minute data, you can see just how significant the legacy open can be. In this specific case it is over four times more likely to set highs or lows in the opening legacy bar.

The statistical analysis of highs and lows, coupled with the liquidity overlay, show a robust way to demonstrate the weakness of standard daily data

In the final test I created more RTH daily data. But this time, I started from the evening session open at 1700h of the prior day, through the night session and through the subsequent day session to the 1400h close. The OHLC RTH daily data bar was thus a 21-hour range.

This chart (*above, Figure 4*) shows BPA from 1 January 2000 forward. In exactly the same way as the first chart, the highs and lows are still being counted to see which percentile (bucket) they fall into. Notice that there were a total of 1,260 minutes in the session split into equal 63 minute (roughly one hour) 5% time slices. Notice the chart nuance in the way I have programmed this. The first bar is at 1700h three quarters of the way up the chart. The chart needs to be read from 75% up to 100% and then from the bottom of the chart at 5% to 70% to complete the 21-hour daily cycle.

You can see that the opening hour from 1700h as reported by exchange data is almost irrelevant and lacks the specific high/low significance of other percentiles. Also notice around midnight to 0200h (approximately) seemed to be the most significant area where highs and lows were being set. In isolation this appears to be better than in the original chart. However, we need to consider a final liquidity overlay.

In this final chart (*below, Figure 5*), you are simply looking at the trade volume in exactly the same way as with the highs and the lows of previous charts. You can see clearly that there is a fraction of the liquidity during the midnight to 0200h region compared to the huge amounts of liquidity surrounding the legacy 0720h old pit session times. The statistical analysis of highs and lows, coupled with the liquidity overlay, show a robust way to demonstrate the weakness of standard daily data.

In summary

In this case, the open doesn't seem to have gone anywhere. It seems to be as significant at 0720h as it was back in the old pit days. And if that is the case, it's doubly important to consider whether using a standard daily data vendor to do your back-testing and trading with has its merits any more.

Maybe standard daily data is dead. Maybe it's a dinosaur along with the pit trading era and should be laid to rest as explained above. And let's face it, this article has discussed only the open and cast a doubt on the validity of trading systems which may be prone to the issues that have been raised. But the open is 25% of the daily price points. For reasons of space, we haven't covered the other 75%, i.e. the high, low or close. Maybe that has its own set of vulnerabilities too? Talking with big hedge funds and banks over the years I have often pointed this out, which has caused some pretty illuminating moments. As one trader put it to me in its purest form: "RTH data, this is pioneering stuff Arthur... traders just don't know they need it yet". CTA

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FIGURE 5: BRITISH POUND STATISTICAL ANALYSIS - VOLUME (1700H TO 1400H, JAN 2000 TO MAY 2014)