DAY TRADING OPTIONS

Profiting from Price Distortions in Very Brief Time Frames

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8. The chart pattern is disrupted and the uptrend ends as the stock begins falling.
9. Institution #2 (average price $100.13) begins selling aggressively as the price falls.

The first institutional investor was able to detect, exploit, and extinguish the emerging trend at the expense of the second institutional investor in addition to the public market. Similar logistics can be found in virtually any comparison of minute-by-minute and overlapping tick-by-tick data. Figure 2.1 illustrates these dynamics using a randomly selected two-minute trading interval for Apple Computer (ticker: AAPL) on 2009/04/24.

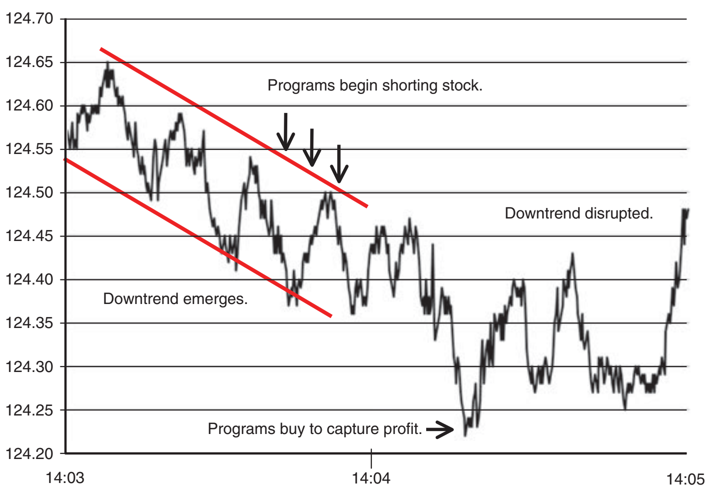

FIGURE 2.1 *Two-minute trading interval for Apple Computer (2009/04/24, 14:03-14:05). The interval included 995 separate ticks and a high-to-low price swing of $0.43. Despite the relatively large swing, the stock closed minute #2 only $0.09 below the opening price of minute #1.*

The stock opened minute #1 (14:03-14:04) trading at $124.58. A downtrend quickly emerged with successively lower highs and lower lows. The trend was evident to both sophisticated algorithmic trading systems and traditional charting programs. However, since algorithmic trading programs vary with regard to their ability to detect a trend, some programs would have initiated trades ahead of others. Furthermore, the broad market exhibited similar behavior, with the S&P 500 falling from 867.35 to 866.31 during minute #1. Complex programs tracking a large number of data streams from multiple markets would have also noticed that the euro briefly strengthened against the U.S. dollar during the previous three minutes (14:00-14:03), climbing from a low of 1.32424 to a high of 1.32621 before declining to 1.32540 during the minute ending at 14:04 (minute #1 of Figure 2.1). The sudden currency reversal is visible as a sharp spike on the 1-minute Euro:USD ratio chart.

At the beginning of minute #2, the price fell sharply. Algorithmic trading systems that closed their short positions near the bottom averaged more than $0.20 profit. This activity destroyed the downtrend by causing the stock to rise. It also caused the price to become more volatile. The chaos is evident throughout the minute. It became especially relevant near the end when the price suddenly spiked up into the original trading range of minute #1. Traders and programs that remained short lost all their profit during these few seconds.

The rise and fall pattern visible near the left side of Figure 2.1 was driven by the behavior of a large number of computer programs and private investors executing buy, sell, and sell short orders with different levels of aggressiveness at different times. Also included is the execution of previously entered stop/sell and stop/buy orders. Most sophisticated programs are designed to take advantage of these price swings by incrementally building positions across several up- and downticks.

In this particular case, the stock remained volatile for the remainder of the trading day. During the next two minutes it climbed to $124.52 before entering into a new downtrend that lasted for eight minutes. Beyond this point, the price climbed and fell sharply several times with no discernable pattern. Although the behavior appears to be random on charts displaying discreet time frames, tick-by-tick analysis reveals distinct trends that resemble those of Figure 2.1.

A key question emerges: If the actions of automated trading systems remove both the trend and its chart pattern, then why do trends lasting several minutes or longer exist at all? The answer lies in the fine structure of the individual tick-by-tick trading patterns. When the conditions that triggered the original trade persist, algorithmic trading systems will either keep the trades open or add to them. This activity itself often becomes an indicator that can trigger additional trades from other computerized systems and ultimately public customers. Alternatively, a trend can end because a single large trade achieves its profit goal and the responsible program begins unwinding the original trade. This activity can trigger a sharp reversal when other automated systems sense the change and also begin closing their positions.

Finally, moving from tick-by-tick analysis to bars composed of many ticks can create distortions that mask underlying volatility. These distortions can arise in any time frame that has precise boundaries. Charts built on single-minute bars are no more immune to the problem than charts built on bars depicting longer time frames because, as we saw in Figure 2.1, a single minute can contain multiple reversals. These changes and subtrends are invisible at the level of granularity imposed by the length of each bar. If, for example, a chart is constructed using one-minute intervals, the exact timing of each minute's open and close determines whether a new trend appears orderly or disorderly. False trends often emerge under these circumstances that would not exist if the boundaries for each minute were shifted by just a few seconds.

A Simple Illustration

Financial markets are a zero-sum game in the sense that every dollar won by one investor must necessarily be lost by another. Competing against high-performance systems that trade at the individual tick level is, therefore, extraordinarily difficult for a public customer using standard off-the-shelf analytical tools. These concepts can be illustrated using a variety of scenarios that don't involve the stock market. Suppose, for example, that we were attempting to bet on the average length of a daily meeting scheduled to begin each day between 9:00 and 9:15 at a large corporation. For the purpose of this discussion, we will treat the meeting length as if it were a stock price. Earlier start times, therefore, translate into longer meetings. We will also assume that the same group of attendees is present at each meeting.

The scenario we will consider involves slight but steady decreases in the starting time of the meeting over the course of a few weeks. As with a stock price, changes in the meeting time display a certain level of volatility, and no trend is straight up or down. However, an astute investor charting the 10-day moving average has noticed a consistent pattern. Turning to a slightly more sophisticated analysis, he compares the 10- and 100-day moving averages and becomes convinced that a trend is emerging because the 10-day average has crossed below the 100-day average.

Many other charting tools and analytical approaches are available to our investor. Being cautious, he decides to look at broader trends that span several regular meeting schedules. A cursory review reveals that the starting times of several other morning meetings have also begun to fall, resulting in longer meetings. A strong upward trend is apparent across the company. Other dynamics support the trend: Starting time volatility is falling and attendance across all meetings is rising. In stock market terms these trends are interpreted as rising price (longer meetings), falling volatility (more consistent start time), and rising volume (more consistent attendance). If the meeting length were a stock price, our investor would go long by purchasing the stock or call options, or selling puts.

Unfortunately, all the evidence gathered by our investor is indirect. His institutional counterpart, however, has detailed real-time information that can be used to make precise predictions. This information is specific to each of the attendees. It includes the time they wake up, eat breakfast, leave their home, and whether they stop to put fuel in their car, in addition to details about the traffic they encounter on the way. Each data item arrives via a separate data feed, and the information is combined and processed to provide a constantly updated picture. Like the tick-by-tick systems used to predict trends in the stock market, this system is constructed with powerful computers and high-speed fiber-optic links.

Just as our first investor finalizes his decision to structure a long position, one of the data feeds reveals that a malfunctioning traffic light has caused a traffic jam that affects two of the meeting attendees. Only a few moments later, it is discovered that another attendee has stopped to buy fuel for her car. At this point in time, the computer program projects that the average arrival time will be five minutes later than that of the previous day. Armed with this information, the institutional investor takes the other side of the first investor's trade by shorting the stock, selling calls, or buying puts.

The institutional investor clearly wins this particular exchange by taking advantage of precise, timely, and detailed information. He has an undeniable advantage. Furthermore, the trend discovered by the first investor may be totally invalid. The only way to know would be to understand the combined effects of dozens of underlying parameters that affect the arrival times of the attendees. That information is available only to the second investor, who can best optimize his use of capital with very brief trades placed at just the right time.