

PART I

The Casino Paradigm

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CHAPTER 1

Developing Positive Expectancy Models

In the case of an earthquake hitting Las Vegas, be sure to go straight to the keno lounge. Nothing ever gets hit there.

—An anonymous casino boss

There are some prerequisite elements that are common to all successful trading programs. This and the next two chapters that follow will cover such elements: This chapter is on developing positive expectancy trading models, the second on implementing robust risk management methodologies, and the third on trader discipline. Let's get started.

WHY TECHNICAL ANALYSIS HELPS

Technical analysis is perhaps the single most valuable tool used in the development of positive expectancy trading models. According to technicians, the reason that technical analysis helps in the development of such models is due to the notion that "price has memory." What does this mean? It means that when crude oil traded at \$40 a barrel in 1990, this linear, horizontal resistance area would again act as resistance when retested in 2003 (see Figure 1.1). This reality drives economists crazy because, according to economic theory, it makes absolutely no sense for crude oil to sell off at \$40 a barrel in 2003, since the purchasing power of the U.S. dollar in 2003 is different from its purchasing power in 1990. Nevertheless, according to technical analysis, the selloff at \$40 a barrel in 2003 made perfect sense



FIGURE 1.1 Rolling Front-Month Quarterly CME Group Crude Oil Futures Showing \$40 a Barrel Horizontal Resistance

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because price has memory. Price has memory means that traders experienced pain, pleasure, and regret associated with the linear price level of \$40 a barrel. Let's look at this in greater detail.

Price has memory because back in 1990 a group of traders bought oil at \$40 a barrel. They had all sorts of reasons for their purchase: Saddam Hussein had invaded Kuwait, global demand for oil and products was strong, and so on. However, if these buyers were honest with themselves, as oil prices tumbled, all these reasons evaporated and were replaced with one thought and one thought only—usually expressed in prayer form—“Please, God, let it go back to \$40 a barrel and I swear I'll never trade crude oil again.” When it does rally back to \$40 a barrel, that linear price represents the termination of the painful experience of loss for such traders. And so they create selling pressure at this linear, \$40-a-barrel price level.

There is another group of traders that are also interested in crude oil at the linear price level of \$40 a barrel. This is the group that sold futures contracts to the first group. Because they sold the top of the resistance area, no matter where they covered their short positions, they took profits and so have a pleasurable experience associated with the linear \$40-a-barrel

price. Consequently, when crude oil again rises to \$40 a barrel in 2003, they seek a repetition of that pleasurable experience associated with the linear \$40-a-barrel price and they, too, create selling pressure.

But of course, most traders neither sold nor bought at \$40 a barrel in 1990. Instead, they stood on the sidelines regretting that they missed the sale of the decade. The beauty of the markets is that if you wait around long enough, eventually you will probably get to see the same prices twice. When this happened in 2003, this third and largest group of traders got to minimize the painful feeling of regret by selling the linear resistance level price of \$40 a barrel. This is why technical analysis helps, because most humans seek to avoid pain and seek pleasure instead. In the markets, pain and pleasure play themselves out at price levels such as \$40 a barrel in crude oil.

However, in April 2011, when I wrote these words, crude oil was trading at \$108 a barrel. Obviously, something changed. In fact, things constantly change in the markets. As Chapter 4 shows in great detail, change and the cyclical nature of price action are among the few things that are in fact guaranteed in the markets. What changed was that during 2004, crude oil experienced a phenomenon known as a paradigm shift. A paradigm shift is an intermediate to long-term shift in the perception of an asset's value. Many fundamental factors led to this paradigm shift. The most important one perhaps was unprecedented demand for hydrocarbons from China, India, and other emerging market economies.

The interesting part about technical analysis, and more specifically about price having memory, was that when this paradigm shift occurred, we did not simply leave \$40 a barrel on the ash heaps of market history. Instead, during May 2004 when oil broke above \$40 a barrel, the psychology of the market shifted and everyone who sold crude oil at \$40 a barrel was wrong and everyone who bought at \$40 a barrel was right. Consequently, when in December 2004 the market retested \$40 a barrel, those who sold had a chance to alleviate the painful experience of loss, those who bought \$40 a barrel in May had a chance to repeat the pleasurable experience of profit, and those who regretted missing the opportunity to buy at \$40 a barrel had the chance to minimize that feeling of regret by buying at that price. The old resistance price of \$40 a barrel had become the market's new support level (see Figure 1.2).

Next, fast-forward the clocks to September 15, 2008. Lehman Brothers is in bankruptcy, credit markets are frozen, and it is obvious that crude oil—along with almost every other physical commodity—is in the throes of a bear market. In fact, crude oil prices have dropped from \$147.27 a barrel to \$95.71 a barrel. On that day, as on various prior and subsequent days when teaching trading courses to speculators and hedgers, someone asked, “Where do you think the bottom is in crude oil?” My answer seemed



FIGURE 1.2 Rolling Front-Month Weekly CME Group Crude Oil Futures Showing Breakout Above and Retest of \$40 a Barrel as Support

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incredible to the roomful of young energy traders: “Forty dollars a barrel.” Of course my prediction proved too optimistic as crude oil eventually bottomed out at \$32.48 a barrel (see Figure 1.3). Nevertheless, the market had proven over the course of the decades that \$40 a barrel was a level at which price had and continues to have memory in the crude oil market.

THE INEFFICIENT MARKET

Incredibly, academics and economists with strong science backgrounds have put forth a theory of an efficient market without any statistical evidence of market efficiency, despite much evidence to the contrary. The markets have always been inefficient, have always cycled from panic to bubble to panic again, and will always continue to do so. In fact, as stated earlier, this cyclical nature of market behavior is one of the few things we as traders can actually count on.

Ludicrous as it sounds, according to efficient market hypothesis there can be no such thing as a bubble because markets are always trading at



FIGURE 1.3 Rolling Front-Month Monthly CME Group Crude Oil Futures Showing \$40 a Barrel as Support during Great Recession

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their correct, or efficient, price levels. In other words, according to these theorists, a tulip in Holland that was correctly priced at 2,500 guilders on February 2, 1637, was also correctly priced at 2 guilders on February 3, 1637.¹ I call this an example of the “Napoleon Analogy.”

The Napoleon Analogy occurs when we enter a mental institution in which one charismatic patient has thoroughly convinced himself as well as other patients that he is Napoleon. No matter how many psychiatrists struggle to assure these patients that he is not Napoleon, neither the deluded patient nor his loyal admirers can be convinced. One day, our delusional patient escapes from the mental institution and discovers not a single soul who believes him to be Napoleon. This of course is because he never was Napoleon. He was merely deluded and had convinced others of his delusional belief. Perhaps he will never be convinced that he is not Napoleon. Perhaps there are still people who remain convinced that synthetic Collateralized Debt Obligations (CDOs) on pools of subprime mortgages circa 2005 should still be trading at par value. Despite their conviction to the contrary, those synthetic CDOs are still worthless. Furthermore, much like our deluded, Napoleon-impersonating mental patient, despite the

temporary delusional valuation of these synthetic CDOs at par by various financial institutions during the 2005 housing market bubble, the synthetic CDOs were, in fact, always worthless.

Nevertheless, just because the majority are delusional and prices are temporarily out of sync with value, this book is for traders, not long-term investors, and traders must wait for evidence that our mental patient has escaped from the hospital before trading against irrational, bubble-induced price levels. We wait for evidence in the form of lower prices because irrationally priced markets tend to become even more irrationally priced—this is the nature of an inefficient, fat-tailed market—before crashing, and no one can know where the top is until after that top has been proved through the printing of lower prices. As John Maynard Keynes said, “Markets can remain irrational a lot longer than you or I can remain solvent,” or as I like to say, “Don’t anticipate, just participate.” Wait for the evidence of a top to start selling and wait for evidence of a bottom to start buying. The history of markets is littered with graves of those who were prematurely right. Being right over the long run is fatal for traders. Speculators need to be right on the markets in the right season. For example, around January 2009, SemGroup started shorting crude oil around \$100 a barrel. They correctly surmised that oil prices were unsustainable at such levels and were out of sync with the asset’s long-term value. Nevertheless, on July 16, 2008, SemGroup announced that they had “liquidity problems” and sold their CME Group trading account to Barclays. On December 12, 2008, January 2009 crude oil futures on the CME Group bottomed at \$32.48 (see Figure 1.4). Of course, this was no help to SemGroup since they had filed for bankruptcy on July 22, 2008.²

But why does the inefficiency of markets matter to us as traders? It is this inefficiency that allows us to develop positive expectancy trading models. This inefficient behavior of markets leads to what statisticians call a leptokurtic—as opposed to a normal—distribution of asset prices (see Figure 1.5). This means that prices display a greater propensity toward mean reversion than would occur if markets were efficient, and, when they are not in this mean reverting mode, they have a greater propensity to trending action (statisticians call this propensity for trending action the fat tail of the distribution).

It is because markets display this leptokurtic price distribution that positive expectancy trading models tend to fall into two categories:

1. Countertrend models that capitalize on the market’s propensity toward reversion to the mean.
2. Trend-following models that take advantage of those times when markets undergo a fat tail event.



FIGURE 1.4 Rolling Front-Month Weekly CME Group Crude Oil Futures Showing SemGroup's Failure Despite Correct Assessment of Asset's Long-Term Value
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It is no coincidence that two of the three major types of technical indicators are oscillators that signal when markets are—at least temporarily—overbought or oversold and trend-following indicators like moving averages, moving average convergence divergence, Ichimoku clouds, and so on, which signal when markets are displaying bullish- or bearish-trending behavior.

You might be asking yourself, “If markets can do only two things—trend or trade in a range—why are there three major categories of technical indicators?” The third major category is the volatility indicators, and they

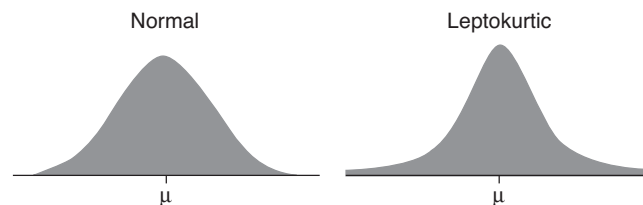


FIGURE 1.5 Leptokurtic versus Normal Distribution of Asset Prices
Source: www.risk.glossary.com.

clue us in to when markets shift from their mean reverting mode to trending action and vice versa. In fact, it is this third category of indicators that proves most useful in the development of positive expectancy trading models and I have consequently devoted Chapter 4 to the various types of volatility indicators, how they can be used, and their limitations.

IF IT FEELS GOOD, DON'T DO IT

Well, speculative trading sounds simple enough. Markets can do only two things, either trade in a range or trend, and volatility indicators can be used to clue you in to which kind of behavior the market is currently exhibiting. Why then do almost all speculators lose money? They lose because successful speculation requires that we consistently do that which is psychologically uncomfortable and unnatural.

Why are mean reversion trading models psychologically uncomfortable to implement? In Figure 1.6 (see Figure 1.6) we see that on Friday, March 6, 2009, the E-Mini S&P 500 futures are not only in a clearly defined bear trend, but that they have once again made new contract lows.

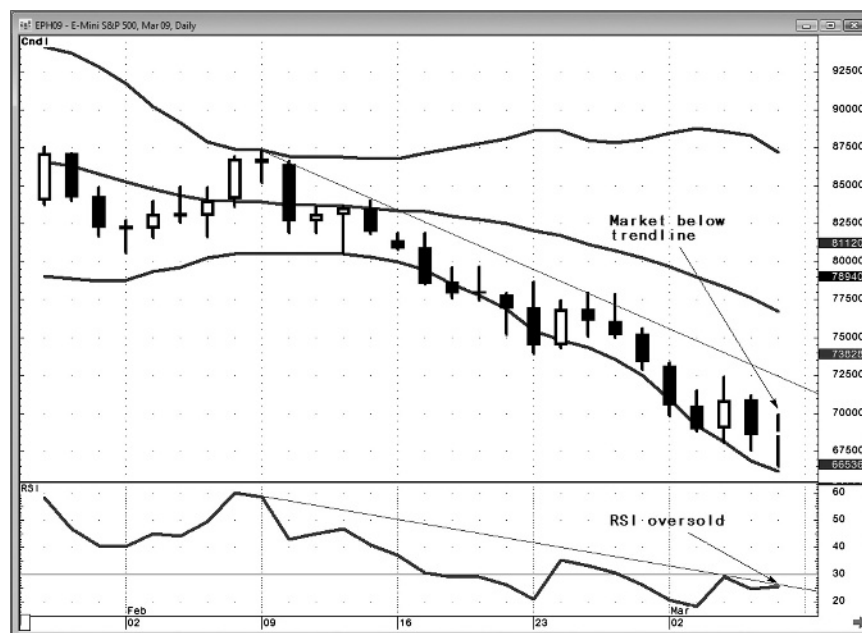


FIGURE 1.6 March 2009 E-Mini S&P 500 Futures Contract Makes New Lows with Relative Strength Index Oscillator at Oversold Levels

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What the chart cannot show is how overwhelmingly bearish market sentiment was on that day. On Fridays, after finishing my market analysis for the day, I turn off the computer and turn on the financial news, as it is usually entertaining. On this particular Friday, the market had just closed and they were interviewing two market pundits. They will typically have one interviewee advocating the bear argument while their counterpart is bullish. Our first analyst's forecast was 5,000 on the Dow Jones Industrial Average and 500 in the S&P 500 Index. As soon as the words "five hundred" left his lips, the other interrupted, "You are out of your mind." I thought, "Ah, here's the bullish argument." The other analyst then proceeded to berate our bearish forecaster by telling him he was out of his mind because the Dow was going to 2,000 and the S&P 500 to 200. I glanced at the bottom of the screen just to make certain that I had not lost my mind . . . no, the E-Mini S&P futures had in fact closed at 687.75. Next thought, "When the market is at 687.75 and the bullish analyst is calling for it to drop to 500, this has got to be the bottom." Sure enough, the 2009 stock market bottom occurred on Friday, March 6, 2009 (see Figure 1.7). The trader using a mean reversion model has to consistently buy in to that type of overwhelmingly



FIGURE 1.7 Rolling Front-Month Weekly E-Mini S&P 500 Futures Contract Showing Close Below Lower Bollinger Band and Oversold Reading on Relative Strength Index

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bearish sentiment or sell in to a 1630s-era tulip—or 2005 housing—bubble-like bullish environment.

Executing a trend-following model is even more psychologically challenging. The market breaks to 1068, all-time new highs. I tell you that the prudent play is to buy these all-time new highs. You glance at a chart and notice that only 12 weeks ago it was trading at 775. You place a limit order to buy 775, figuring you will buy cheaper, experience less risk, and enjoy more reward. By placing the order at 775 you are trading the asset's price irrespective of value (for more details on trading price irrespective of value see Chapters 5 and 10). On November 3, 1982, the Dow Jones Industrial Average hit an all-time new high of 1068.1 (see Figure 1.8). Since that time we experienced market crashes, the bursting of the dot-com bubble, terrorist attacks, the worst credit crisis since the 1930s, and the Great Recession, and as of the writing of this book in 2011, we still have not traded anywhere close to 1068 (see Figure 1.9).

For both mean reversion as well as trend-following traders, the profitable trade is the one that is almost impossible to execute. Or as I like to say, “If it feels good, don’t do it.” If it feels awful, like a guaranteed loss—more often than anyone could imagine—that is the profitable trade.



FIGURE 1.8 Quarterly Cash Dow Jones Industrial Average Chart Breaks to All-Time New Highs in 1982

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FIGURE 1.9 Yearly Cash Dow Jones Industrial Average Chart from 1982 Break of Old Highs to July 2010

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If, on the other hand, the trade feels like easy money . . . run the other way. We are all human beings, experiencing greed and fear at the same moment; if it feels easy for us, it feels easy for everyone else and is almost guaranteed to be a losing proposition. If, by contrast, it feels almost impossible for us, then few others can take the trade, and by doing that which is psychologically uncomfortable—by taking the difficult trade—you make the money being lost by the other 90 percent of all speculators.

Although the reader now knows why 90 percent of all speculators fail, we can learn more about how to succeed and how to develop positive expectancy models as well as risk management by examining the psychological biases that lead to failure for the majority of speculators. In 1979, two social scientists, Daniel Kahneman and Amos Tversky, developed an alternative to the dominant efficient market hypothesis of market behavior. As opposed to assuming rationality of market participants and our preference for choices with the greatest risk-adjusted utility, Kahneman and Tversky posed various questions regarding risk and reward. The results of their research became known as Prospect Theory and the Reflection Effect. Their work proved that people were irrational and biased in their decision-making processes.

They asked people to make specific choices between various alternatives. Kahneman and Tversky first had participants choose between one of the two gambles, or prospects:

Gamble A: A 100 percent chance of losing \$3,000.

Gamble B: An 80 percent chance of losing \$4,000, and a 20 percent chance of losing nothing.

Next, you must choose between:

Gamble C: A 100 percent chance of receiving \$3,000.

Gamble D: An 80 percent chance of receiving \$4,000, and a 20 percent chance of receiving nothing.

Kahneman and Tversky found that of the first grouping, 92 percent chose B. Of the second grouping, 20 percent of people chose D.

What the reflection effect proved was that people were risk-averse regarding choices involving prospects of gains and risk-seeking over prospects involving losses.³ This means that virtually all human beings—including successful speculative traders—are wired the same way: We are all programmed to take small profits and large losses (see Figure 1.10). What then separates successful traders from the rest of the speculative community? Successful traders have developed and employ rule-based, positive expectancy models that force them to overcome their innate bias toward small profits and large losses. They have learned to accept small losses quickly and to let large profits grow larger. Or, as I like to tell my students, “You need to continuously ask yourself, ‘How can I reduce the risk? How can I increase the reward?’” The positive expectancy models

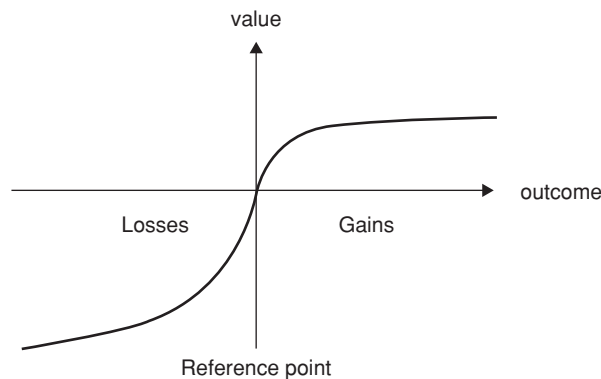


FIGURE 1.10 Prospect Theory

force us to do that which is psychologically unnatural and uncomfortable. They force us to succeed despite our biases and they do so by exploiting the irrationality and biases of other market participants.

“JUST MAKE THE MONEY”

Traders will often ask me why I think a particular market is going to go down, why I am long some other market when the inventory numbers just came out decidedly bearish, and so on. If I have the time, I might give them a reason or two, although I will more often simply respond with, “Do you want to understand all the intricate reasons behind the moves or do you want to make the money? Nobody can know all the reasons. Forget the reasons, just make the money.”

The problem or limitation with fundamental analysis—as well as the problem with classical technical indicators such as a trendline—is its subjectivity. Development of positive expectancy models is much tougher with fundamental analysis because we are trying to develop models with disciplined rules to help us get away from our natural tendency to trade with a bias toward big losses and small profits. Remember, you can always find fundamental arguments for selling or buying at any given price, otherwise no one would be willing to buy or sell at that price. Also, these arguments can actually prevent you from acting on the high-probability move or—even worse—from managing the risk. In trading, we call this *paralysis from analysis*. Consequently, most positive expectancy models are based upon objective, mathematical technical indicators such as oscillators or moving averages. We can never know all the reasons why the market rose on bearish inventory numbers or why it fell despite a decrease in unemployment, but we can develop various rules for entry, exit, and risk management based upon objective, mathematically derived technical formulas.

Does this mean that fundamental analysis is useless for speculative traders? Not at all. Instead I am trying to establish a realistic understanding of its limitations before our examination of its utility. So how can we augment our positive expectancy models with fundamental analysis? The way I teach fundamental analysis to traders is through old Wall Street clichés. First cliché: “Buy the rumor, sell the news.” If the rumor is that the unemployment report is going to show a decline in unemployment and therefore a strengthening economy, one might buy the stock market. Once the report comes out showing the anticipated improvement in jobs, sell the market. Why? Because the reason for the rally has come to fruition and there is therefore no longer any reason to own equities. However, there is one caveat to this cliché, and it is another Wall Street cliché: “The market hates surprises.” This means that if the market was rallying before the release of

the unemployment report based on the rumor of the jobless rate falling to 9.7 percent, and the rate actually falls to 9.1 percent, equities should probably still be bought because the news was a bullish surprise beyond the expectations of market participants.

Another valuable way of incorporating fundamental news into our positive expectancy trading models is to capitalize on times when the market reacts in the opposite manner from what would be expected based upon the release of a bearish or bullish fundamental news item. For example, on April 29, 2009, the U.S. Energy Information Administration released its weekly inventories report, which showed that crude oil stockpiles increased by twice the expected amount.⁴ Despite this bearish news, the oil market rallied (see Figure 1.11). This rally on bearish news was the most bullish information the market could offer. It suggested buyers were waiting for bearish news to establish or add to their existing long positions; consequently, the market could not drop despite the release of negative fundamental news. Or as my friend Richard Hom likes to say, “If they can’t sell off on this news, what’ll they do when the bullish news hits?”

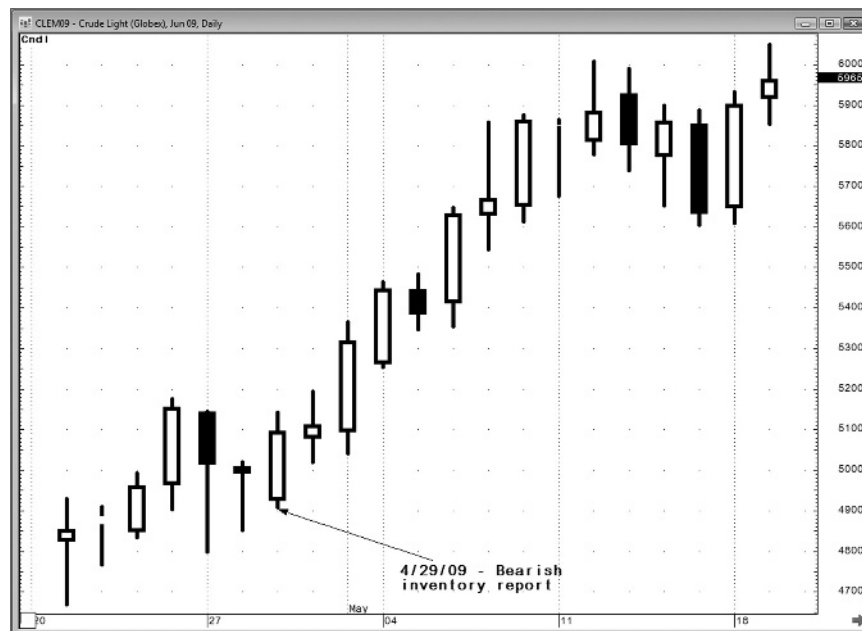


FIGURE 1.11 June 2009 Daily CME Group Crude Oil Futures Contract Rallies Despite Bearish Inventories Report

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Perhaps the most invaluable way of incorporating fundamental analysis into our positive expectancy model is its ability to help us distinguish between price shock events and paradigm shifts. We have already defined a paradigm shift during our examination of the crude oil market and its shift of long-term value from below to above \$40 a barrel. You may recall that this shift in the perception of value of crude oil occurred because of a combination of fundamental supply and demand factors. By contrast, a price shock is a headline-driven event that temporarily spikes the price of an asset beyond its value.

The easiest way to distinguish between the two is by looking at some historical examples. Figure 1.12 clearly illustrates a long-term shift in the perception of value for high-grade copper. Before 2005, the \$1.60 area acted as resistance to higher prices throughout the contract's history. In 2005, the perception of value of copper underwent a paradigm shift and as of the writing of this book in 2011, the \$1.60 area represents a long-term support level for the asset. One of my favorite examples of a price shock event was the capture of Saddam Hussein on Saturday, December 13, 2003, by coalition forces during the second Gulf War. Hussein's capture occurred over



FIGURE 1.12 Quarterly Continuation Chart of CME Group Copper Futures Showing 2005 Paradigm Shift

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FIGURE 1.13 2003 Hourly Cash Eurocurrency-U.S. Dollar Chart Showing Price Shock Event of Hussein's Capture

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the weekend and when the cash foreign exchange markets opened on Sunday, December 14, the U.S. dollar rallied sharply against the eurocurrency. However, over the course of the next 24 trading hours, currency traders realized that the capture of Hussein had no lasting impact on the value of the U.S. dollar against the eurocurrency and the asset returned to its pre-headline value area (see Figure 1.13).

Why is the ability to identify a paradigm shift essential to our implementation of a positive expectancy trading model? Because these models tend to be driven by rules generated from mathematically derived technical indicators like moving averages, Bollinger Bands, and so on. If we blindly ignore the paradigm shift, it is possible that these technical tools will tell us the wrong story regarding price behavior and asset value, especially if we are using mean reversion models.

If our mathematically derived rule-based system is a seasonal pattern recognition model, we must prepare for the occurrence of an anomaly year. Anomaly years are well illustrated by examining the unleaded gasoline-heating oil spread. Historically, unleaded gasoline had always traded at a premium to heating oil during the spring, typically peaking

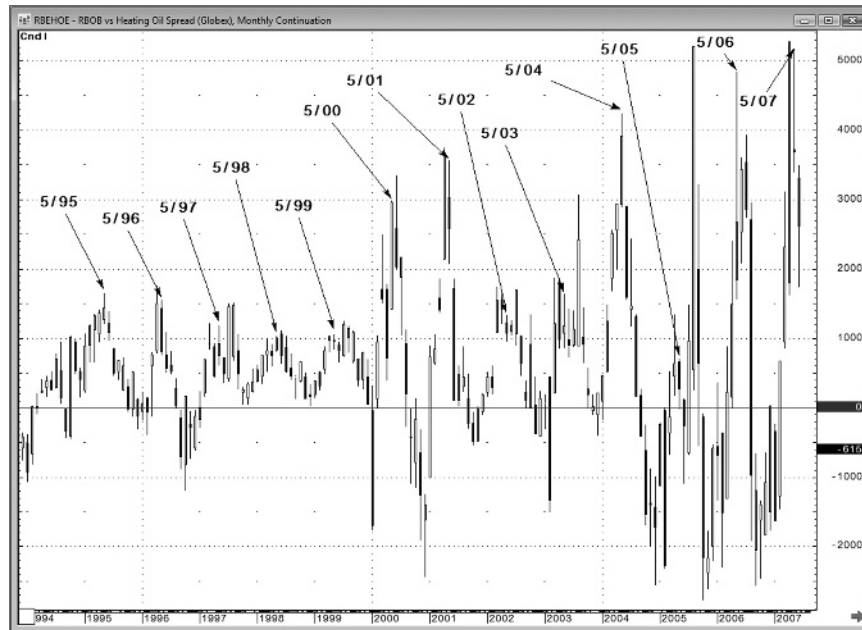


FIGURE 1.14 1995-2007 Monthly Continuation Chart of CME Group Unleaded Gasoline-Heating Oil Spread Showing Pattern of Seasonal Strength in May

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against the winter fuel during the calendar month of May in anticipation of summer driving season (see Figure 1.14). However, in 2008, the market experienced an anomaly year in which petroleum product prices moved counter to this historical relationship. Increasing demand for middle distillates like heating oil from developing world nations drove the price up against unleaded gasoline because the latter was not used as the primary transportation fuel in those countries (see Figure 1.15). For those who blindly followed their technical models to the exclusion of fundamental news, it seemed like easy money to buy the undervalued unleaded gasoline and sell the overvalued heating oil. By contrast, those with one eye on the fundamentals tempered their technically driven models in light of this shift in the value of petroleum products.

Regarding price shock events, I have often heard traders dismiss such events as completely random and therefore a 50-50 chance. In other words, they do not concern themselves with price shock events and rationalize away their occurrence through the delusional belief that over the long run they will end up on the winning side of the shock 50 percent of the time. Having done the research, I can assure you that price shock events are

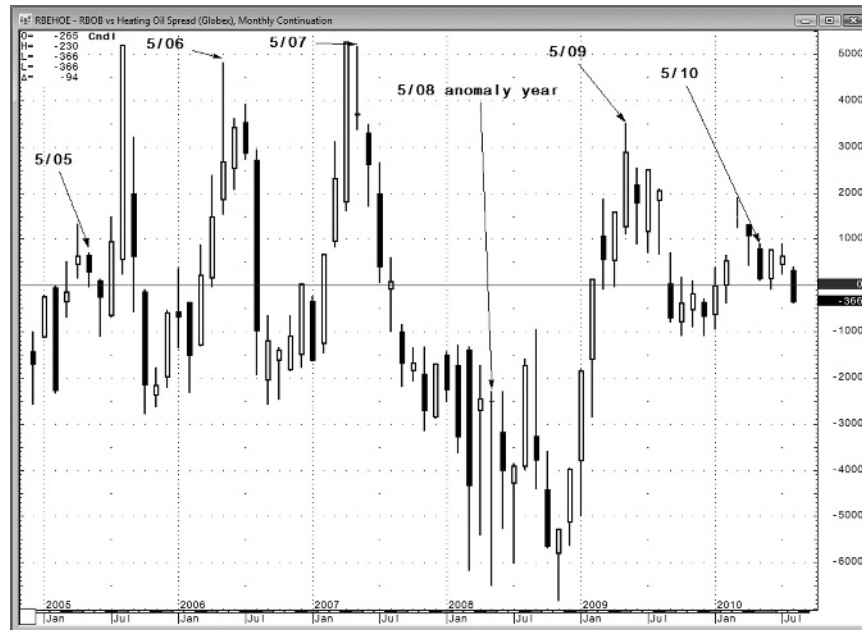


FIGURE 1.15 2005-2010 Monthly Continuation Chart of CME Group Unleaded Gasoline-Heating Oil Spread Showing 2008 Anomaly Year

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not 50-50 propositions. Instead, you have a greater probability of being on the right side of the event if you are trading in the direction of the long-term—one to six months—trend, and a greater likelihood of being on the wrong side if you employ a mean reversion model (see Figure 1.16).

Now that we have examined the strengths of positive expectancy models derived from mathematical technical indicators as well as their weaknesses and tools to offset such weaknesses, we will briefly review turning these models into mechanical trading systems. I say, “Briefly review,” because for those interested in an in-depth study of the topic, I refer you to my first book, *Mechanical Trading Systems: Pairing Trader Psychology with Technical Analysis*. Instead of rehashing materials presented in that book, I merely point out here that mechanical trading systems based on mathematical technical indicators help us determine the following:

- Does this model enjoy positive expectancy?
- What kinds of weaknesses—maximum consecutive losses, worst peak-to-valley equity drawdowns, percentage of winning trades, average trade duration, and so forth—did this model experience in the past?



FIGURE 1.16 September 2001 E-Mini S&P 500 Futures Contract Showing Close Below 40-Day Simple Moving Average Before 9/11/01

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- Am I willing to endure these weaknesses in my real-time trading account or do I need a model better suited to my individual psychological profile as a trader?

FINAL THOUGHTS

Finally, let us examine the augmentation of rule-based, positive expectancy mechanical trading models with what speculators commonly call trader intuition. When people ask me whether my own trading is 100 percent mechanical, I hesitate, because it is, but it is not. It is 100 percent rule-based trading. It never violates rules of the positive expectancy model or of risk management. It does, however, augment rule-based trading with what is commonly referred to as trader intuition.

We need first to differentiate between what gamblers call intuition and authentic trader intuition. If by trader intuition we mean finding an excuse to abandon a rule-based positive expectancy model or rules of risk

management, then such intuition must be avoided at all costs. By contrast, if we are speaking of a method of augmenting our mechanical rule-based models with what is commonly and incorrectly described as intuition, this is another matter entirely.

What is trader intuition? It is a method by which our unconscious augments purely mechanical rule-based trading models. In reality, it is not intuition at all. It is instead a subconscious memory that cannot express itself according to rational proofs because our memories do not typically work in this manner. For example, you look at a chart and your rule says, "Buy at 25." However, your intuition says, "I have seen this type of chart setup before. I know it is going to 12. I am buying at 12." Your decision was truly based on trader intuition or fuzzy memories of a similar setup—perhaps many similar setups—in which the market dropped below the rule-based entry level. Unfortunately, because of the way memory works, we do not say, "I remember that on March 13, 1976, the chart setup with a similar pattern and so there is a high probability of us printing 11 and that is why I am buying at 12 instead of 25." We say instead, "I have seen this setup before. I am buying at 12 instead of 25."