

## CHAPTER 1

# Evidence of the Most Popular Technical Indicators

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The application of various technical indicators is nothing new to the majority of financial market participants. The opportunity to trade a moving average cross or an overbought market is a frequent observation during normal market hours worldwide. The challenge that many ponder is which technical indicators to use. In an effort to resolve that challenge, market participants wonder what others are using. If this information can be identified and verified, market participants will likely monitor those indicators to understand what others are thinking and seeing. Therefore, it might be possible to develop a trading strategy based on the most popular technical indicators.

Although I cannot prove the latter as statistically true, this chapter reveals a hierarchy of the most popular technical indicators on the Bloomberg Professional Service. Then it presents the indicators' commonly accepted signals. But first, it attempts to define what *technical analysis* represents; it would be ill advised to discuss only indicators when technical analysis is much more than that.

## Defining Technical Analysis

Sometimes it seems that the majority of market participants may be misled about the broad scope of theories used in the application of technical analysis when trying to understand and forecast the financial markets. My gut feeling is that if we were to sample a random group of market participants to define technical analysis, they would present terms such as *price*, *moving averages*, *charts*, and *oscillators*. A simple Internet search confirmed my suspicions about what words we would hear. Some of the definitions that can be easily found do a good job of describing parts of the theory, while others should not be read by a technician who lacks a sense of humor.

Three of the better definitions are:

1. Analysis of past price changes in the hope of forecasting future price changes.
2. Analysis based on market action through chart study, moving averages, volume, open interest, formations, and other technical indicators.
3. An approach to forecasting commodity prices that examines the patterns of price change, rates of change, and changes in volume of trading and open interest, without regard to underlying fundamental market factors.\*

Technical analysis offers much more than these definitions suggest. The first is so generic it could be used to describe many fields of analysis. It suggests market participants study prices and fails to elaborate on the variety of data types that can be analyzed. The second mentions *market action*, a common term used in describing technical analysis, but then repeats itself by listing the data sets that represent market action. It assumes that most of the methods of a technical analyst are focused on technical indicators and therefore it does not elaborate on the variety and depth of the theories in this field of study. The third suggests that technical analysis is used in the commodity markets, which is true, but the application of technical analysis is not restricted to only the commodity markets. Technical analysis can be applied to nearly all types of financial markets.

The methods of a technician span a wide array of theories and use countless different tools to strategize, quantify, and discuss the financial markets in ways that other types of analyses don't or can't. One of my goals in writing this

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\*Definition one from [wordnetweb.princeton.edu/perl/webwn](http://wordnetweb.princeton.edu/perl/webwn); definition two from [www.worldwidemoneyexchange.com/terminology.html](http://www.worldwidemoneyexchange.com/terminology.html); and definition three from [www.lind-waldock.com/education/glossary/technical\\_analysis\\_terms.shtml](http://www.lind-waldock.com/education/glossary/technical_analysis_terms.shtml).

chapter is to create a one-sentence definition that broadens the scope of the known definitions. It has proved to be very challenging to come up with one sentence that defines *technical analysis* in its entirety. I believe this is a debate for the entire industry to continuously weigh in on, especially as technical analysis evolves; furthermore, I do not mean to suggest that any one definition would ever be universally acceptable. At present, and with the input of a few friends, I lean toward the following definition:

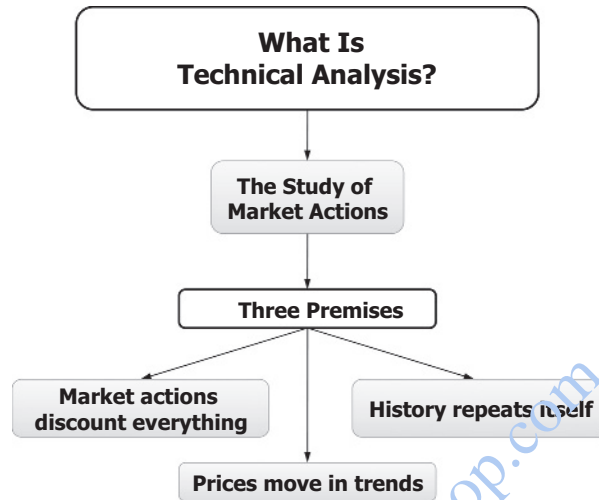
*Technical analysis* is the extraction of information from market data into objective visualizations through the use of mathematics with an emphasis on investor behavior and supply and demand to explain the current and anticipate the future path of the financial markets.

This definition suggests that technical analysis comprises the following five attributes:

1. *Market data*: Represents a variety of data sets that includes the most frequently used ones such as price, volume, and open interest, but does not exclude data sets such as volatility, ticks, ratios, and dividend yields.
2. *Objective visualizations*: A preference for analyzing information in a chart, but visualizations could be more than a chart, such as a figure, table, scatter plot, or query of results.
3. *Use of mathematics*: The application of measurements and calculations to measure the market actions of an individual security or a group of securities.
4. *Emphasis on investor behavior and supply and demand*: We have a bias for identifying rational and irrational market actions and look for imbalances in the availability or desire for a security.
5. *Explain the current and anticipate the future*: We are attempting to understand what the market is telling us about itself to estimate where it may go in the future.

To further explain the definition, we will summarize the three premises of technical analysis (see Figure 1.1) and explain some of the most popular tools (certainly not all) used for this method of analyzing the financial markets.

The first principle states that *market actions discount everything*. This premise suggests that all publicly available information—such as company-specific news, political changes, weather, and so forth—is already priced into the current value of a security. Therefore we do not necessarily need to know why something is happening; we need only to understand the reaction of

**FIGURE 1.1** Defining Technical Analysis Principles

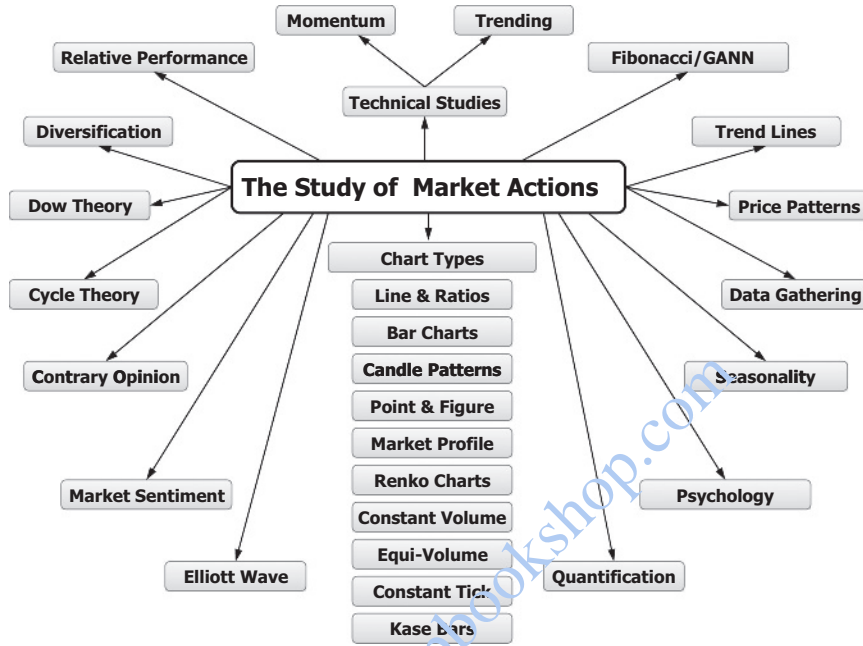
investors to what is happening. If the reaction is positive, market participants will push markets higher. If the reaction is negative, market participants will push markets lower. We then employ a host of tools to decipher the impact of that action on the existing trend.

The second principle states that *prices move in trends*. This relates to Isaac Newton's first law of motion. It suggests that an object in motion remains in motion until acted upon by an equal or stronger force. This force, depending on its strength, can change the direction of motion from its prior path. In technical analysis, this can be thought of as an event or group of events being discounted into the price of a security, causing price to change direction.

The third principle is that *history repeats itself*—I can still hear my high school history teacher's voice as he quoted, "Those who do not learn history are doomed to repeat it." This principle suggests that as the dominant generation or the largest group of market participants transitions out of the financial markets, the incoming generation does not learn or receive enough of the previously accumulated information. Therefore we have an inherent bias to repeat many of the same investment and trading decisions, both correct and incorrect, as did previous generations. Some of this tendency to repeat history is represented by price patterns that form on the chart (i.e., a triangle or head and shoulders).

Now that we have a basis for what technical analysis is, we can discuss the tools that a technician uses. Figure 1.2 is a diagram presenting many of

**FIGURE 1.2** Methods/Theories Used in the Application of Technical Analysis



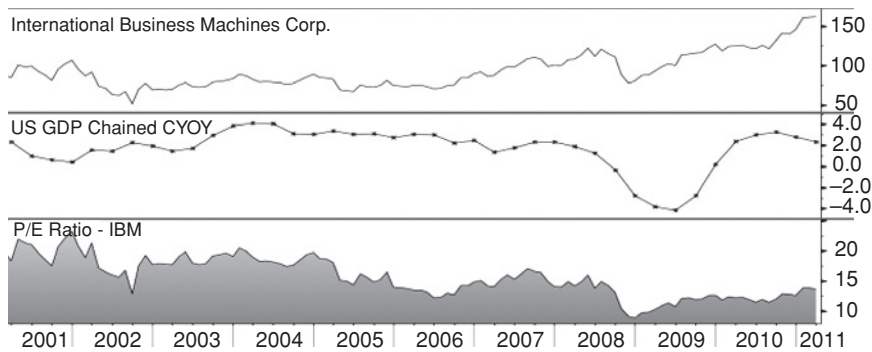
the theories and tools that a technician explores to perform an analysis of the financial markets, but it is certainly not inclusive of all the topics. The goal of this figure is to showcase the broad scope of the theories that encompass technical analysis. There are many books that go into detail about these and other topics. Please see the Recommended Reading section at the back of this book for more information.

The remainder of this chapter will address what the most popular chart types and technical studies are on the Bloomberg Professional Service. We will start with a description of the popular chart types and then break down their popularity. Then we discuss the popularity of technical indicators and break down their applications to the financial markets.

## Defining Chart Types

Rarely does any market participant make an investment decision without observing the current trend. By simply looking at a line chart, a market participant can see upward, downward, or sideways movements. The work of

**FIGURE 1.3** Line Chart Showing Stock Price, U.S. GDP, and P/E Ratio



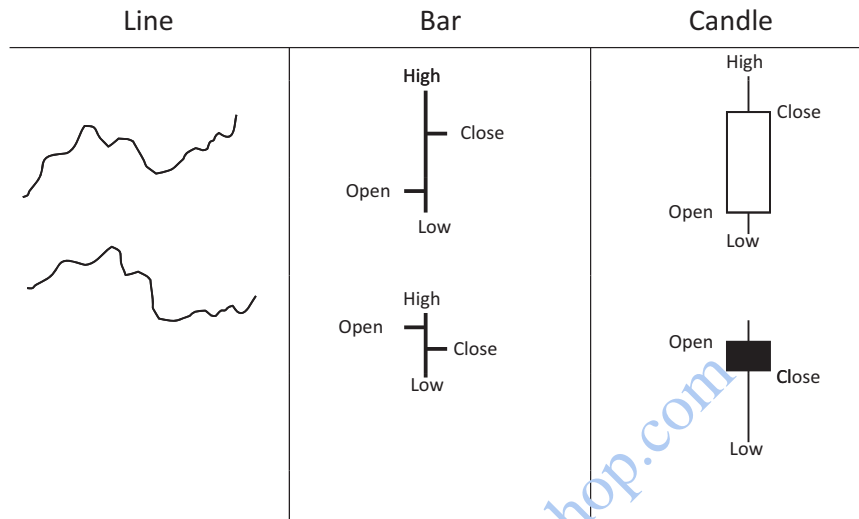
a technician starts with price, and to look at price we use many different types of charts, such as those listed in Figure 1.2. Although this list is plentiful, it is far from being all-inclusive. Throughout this book, we will familiarize ourselves with the line, bar, candle, log, and intraday charts and identify their ranks in popularity among market participants. Later, we will do the same for the most-preferred technical indicators.

A *line chart* is a very elegant and simple type of chart to look at. It provides convenience for faster analysis because it shows the overall direction of trend. It is typically used by an economist analyzing economic data sets, a fundamental analyst scanning a list of securities for performance changes and fundamental trends, and overall very long-term analysis. For example, it could be a historical look at an economic release like gross domestic product (GDP), the price/earnings (P/E) ratio of a stock, or the closing price of a security. Figure 1.3 displays these data sets with added line-chart features that help in differentiating data sets from one another. The middle panel has markers on GDP emphasizing where the closing value was and the bottom panel has shading below the line (P/E ratio) to emphasize the slope of the line.

A *bar chart* is slightly more complex than a line chart in that it offers three more data points per occurrence, when such data exists. It shows the open, high, and low price in addition to the last or closing price.

A *candle chart* is similar to a bar chart in that it displays the same data—the open, high, low and closing prices—but it does so in a more descriptive and artistic fashion to allow for a quicker analysis and a clearer understanding of price movement. Figure 1.4 displays all three chart types. The candle chart differs the most because of the “body,” or the rectangular shape in the middle, representing the opening and closing price for a period of time. Typically,

**FIGURE 1.4** Three Types of Charts: Line, Bar, and Candle



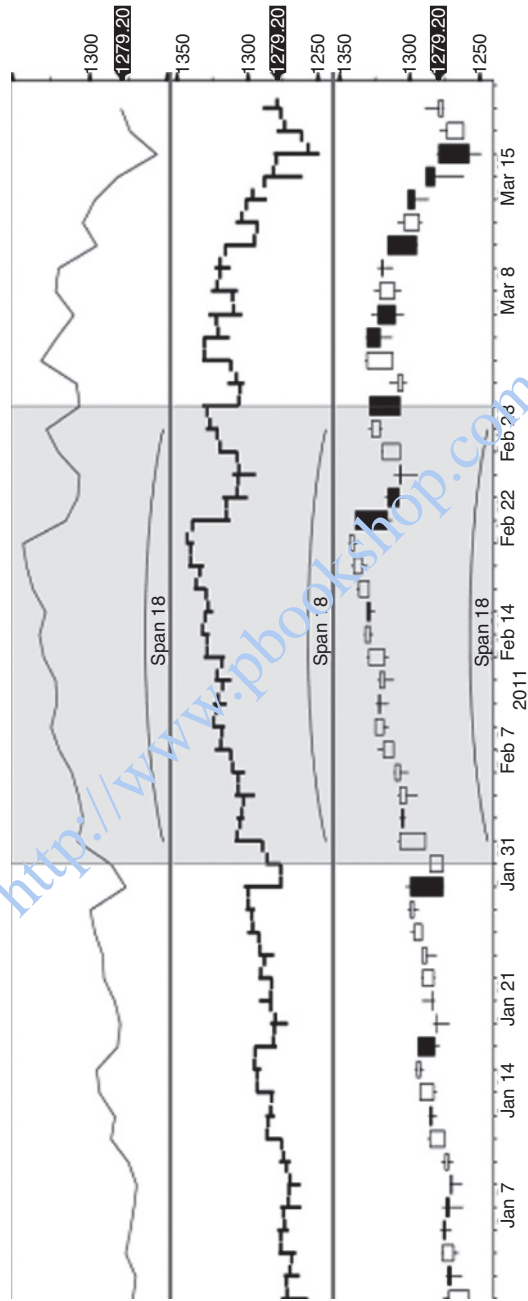
when this body is hollow, it represents an up period. When it is dark or filled in, it represents a down period.

Figure 1.5 is a historical representation comparing all three chart types and shows an example of how the clarity of a candle chart can offer an advantage in identifying more information faster than other chart types. Here we can quickly see that 13 of the 18 trading days in February were up-days (or hollow-bodied candles) and the other six were down-days (or dark-bodied candles).

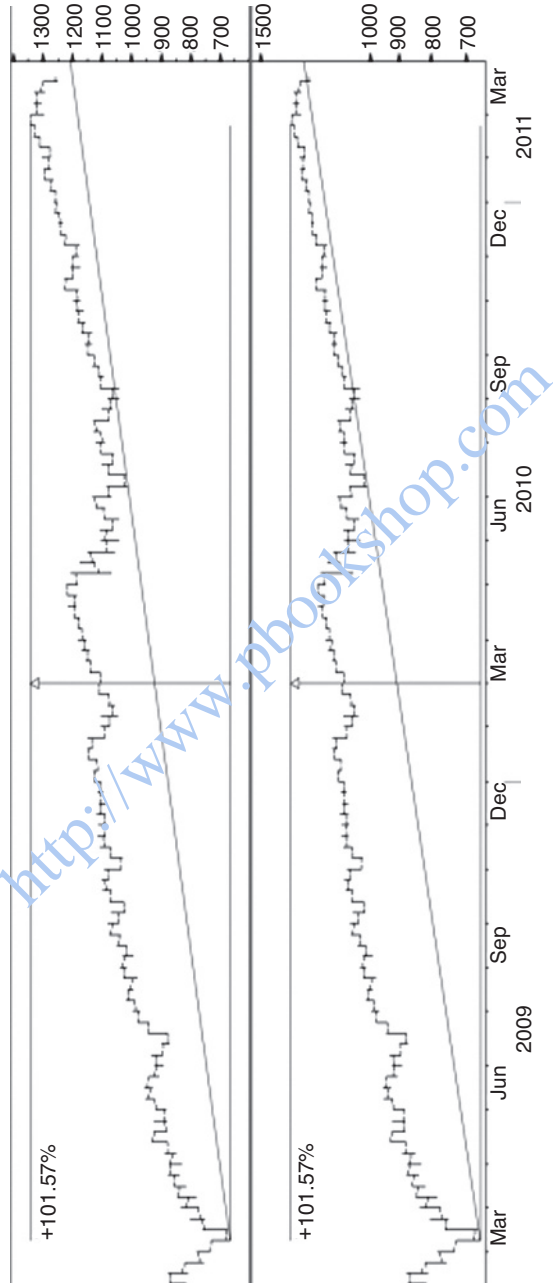
A *logarithmic chart* is designed to represent the percent change between price increments on the  $y$ -axis. As the values on the  $y$ -axis get larger, the distance between them will shrink to a distance that is relative to the percentage change. For example, a security that goes from \$10 to \$20 has experienced a \$10 change or an increase of 100 percent. A security that goes from \$100 to \$110 has also experienced a \$10 change but only a 10 percent increase. Therefore the vertical distance on the  $y$ -axis should be greater for the 100 percent increase and smaller for the 10 percent increase. A good rule of thumb is to consider a log chart, in addition to an arithmetic chart, when the value has changed about 30 percent or more and always as an alternative for long-term analysis.

Figure 1.6 displays the price of the S&P 500 from the lows of March 2009 to March 2011, when price gained about 100 percent. The top panel

**FIGURE 1.5** A Historical Comparison of a Line, Bar, and Candle Chart of the S&P 500 Index



**FIGURE 1.6** Trend Line Analysis Showing Arithmetic versus Log Scale Charts



is an arithmetic chart, showing equal price increments on the  $y$ -axis, and the bottom panel is a log chart, which adjusts the distance between increments on the  $y$ -axis to correspond with percentage change. In the top chart, price is about 50 points above the upward-sloping trend line. In the bottom chart, price is already starting to trade below the upward-sloping trend line. This difference in the display of market actions highlights why it is important to consider both chart types.

The last chart type to introduce is the *intraday chart*. This chart is used primarily by traders who have a short investment horizon or holding period, in order to track the current day or past few days of price movement. It provides a quick glimpse into what is happening right now for the value of a security and is designed to update in real time. An example of a 10-minute bar chart for the past three days is displayed in Figure 1.7. Each bar displays the open, high, low, and close for that 10-minute period of market activity.

### Evidence of Chart Type Popularity

Now that we are familiar with the line, bar, candle, log, and intraday charts, we can discuss the preference of these chart types by market participants who analyze the financial markets through interaction with the Bloomberg Professional Service.

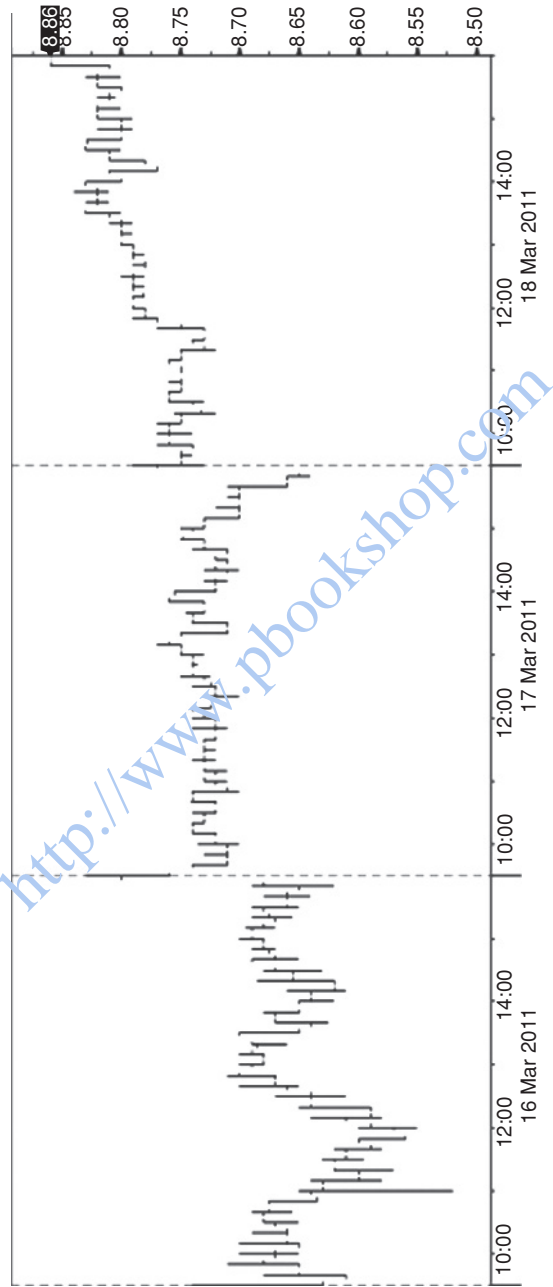
The measurable sample size of these regions is approximately 44 percent in the Americas, 38 percent in Europe, 12 percent in Asia, and 2 percent in the Middle East and South Africa (MESA). In other words, of a hypothetical 100 market participants, 44 were in the Americas, 38 in Europe, 12 in Asia, and 2 in MESA.

Figure 1.8 displays the average chart-type preference of market participants from 2005 to 2010. This reveals, on average, that the line chart is preferred about half the time, the bar chart about one quarter of the time, the candle chart about one fifth of the time, and that the log chart is rarely preferred.

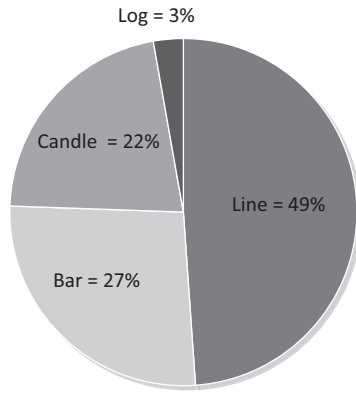
Figure 1.9 displays the average preference for historical charts and intraday charts by market participants from 2005 to 2010. This reveals, on average, that the historical chart is chosen more than twice as often as the intraday chart, or about 69 percent of the time, while the intraday chart is preferred about 31 percent of the time.

Table 1.1 reveals the average preference for each year of the statistics shown in Figure 1.8 and 1.9. This data suggests that the preference for line charts is slowly growing, the preference for bar charts is gradually declining,

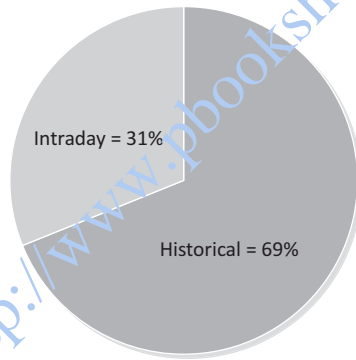
**FIGURE 1.7** Three-Day, Ten-Minute Bar Chart



**FIGURE 1.8** Average Chart Type Preference from 2005 to 2010



**FIGURE 1.9** Average Historical and Intraday Chart Type Preferences



**TABLE 1.1** Yearly Averages of Chart Types and Chart Periods

	2005	2006	2007	2008	2009	2010
Line	46%	47%	49%	52%	50%	50%
Bar	29%	29%	27%	26%	25%	25%
Candle	22%	22%	21%	20%	22%	22%
Log	2.9%	2.7%	2.5%	2.6%	3.6%	3.1%
Historical	74%	74%	71%	67%	65%	65%
Intraday	26%	26%	29%	33%	35%	35%

and the preference for candle charts is steady. It also shows that the preference for historical charts is declining and the preference for intraday charts is rising.

There are three large shifts in the data in this table. The first is in log chart preference from 2008 to 2009. The second is the historical chart preference from 2007 to 2009. The third is the intraday chart from 2007 to 2009. During this two-year period, from high to low, the S&P 500 declined about 56 percent. Therefore the rise in preference for log-scale charts makes sense because the markets experienced a large percentage move. The decline in historical chart preference and the rise in intraday chart preference could represent a few things. It could represent the urgent and repeated desire of market participants to see short-term impacts on the value of their holdings. It could represent investor indecision about what to do with their holdings. Or it could also represent the fear of further losses or hopes of a reversal. Overall it suggests that market participants choose intraday charts more frequently in bear markets than they do in bull markets.

Table 1.2 measures chart type preference of market participants with respect to a region. It answers the question, "What chart type does a region prefer?" Based on the average user preference in 2010, we can conclude:

- The Americas, Europe, and MESA prefer a line chart about half the time.
- After the line chart, the Americas prefer bar charts considerably more than candle charts, while Europe has equal preference for bar and candle charts.
- Asia is the only region that does not prefer the line chart more than the candle chart. Asia prefers the candle chart the most, and prefers it considerably more than the other regions.
- MESA, like Europe, prefers first the line chart and then the candle chart.
- Log chart preference is higher in Europe and the Americas than in Asia and MESA.

**TABLE 1.2** Chart Type Preference of Each Region

	Americas	Europe	Asia	MESA
Line Chart	51%	55%	41%	48%
Bar Chart	32%	20%	14%	20%
Candle Chart	14%	21%	43%	31%
Log Chart	3%	4%	1%	1%
Total	100%	100%	100%	100%

**TABLE 1.3** Comparison of Regional Chart Type Preference to World Preference

	Americas (44%)	Europe (38%)	Asia (12%)	MESA (2%)	Total
Line Chart	43%	40%	15%	1.5%	100%
Bar Chart	58%	30%	11%	1.3%	100%
Candle Chart	27%	34%	37%	2.2%	100%
Log Chart	44%	47%	8.7%	0.6%	100%

Table 1.3 allows us to understand the figures in Table 1.2 in more detail by comparing chart type preference of a region to chart type preference of the world. In other words, the Americas, or 44 percent of the sample size, prefer the line chart 43 percent of the time, or they about equally prefer the use of the line chart. The conclusions we can draw from this table that weren't clear in Table 1.2 are:

- Although Asia used line charts the least of all the regions in Table 1.2, its preference for line charts in Table 1.3 is 25 percent greater than its sample size. Asia's preferences for a bar or line chart is about equal.
- Although MESA preferred the line chart most of all charts in Table 1.2, its candle chart preference in Table 1.3 is greater than its sample size, and the line chart preference is less. Candle chart preference is well represented by MESA.
- The log chart is greatly preferred in Europe and equally preferred in the Americas, while Asia and MESA do not prefer it.

### Evidence of Technical Indicator Popularity

Regardless of the chart type that you prefer, chartists and technicians take price and apply an abundance of calculations to it in order to gain a better understanding of what price or market actions are telling them. A question I frequently hear from those who are starting to use technical analysis is "What indicators (calculations) should I use?" In my opinion, there is no "right" technical indicator. The selection and application of one or a handful of studies is based on a person's investment style, trading strategy, risk tolerance, goals, and available time commitment to learn the ins and outs of those indicators independently and together. We could back-test these indicators

and strategies, but perhaps that will be in another book. Overall indicator preference can be defined with the data we discuss in the next few pages.

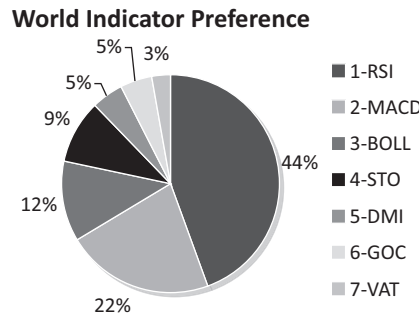
The first step to learning about them is to read some reliable information that provides an introduction into the many indicators that exist. While reading about them, you could select half a dozen studies and dig deeper into their calculations and tendencies. A strong recommendation would be to choose a set of indicators that have different objectives, such as a smoothing study like MACD, a momentum study like RSI, and a distribution study like Bollinger Bands. The next step would be to start applying them individually to a chart to see how they react to price movements, and finally applying them together.

For reference, the following studies and abbreviations will be used when discussing the indicators. Simple Moving Average (SMA), Exponential Moving Average (EMA), Relative Strength Index (RSI), Moving Average Convergence Divergence (MACD), Bollinger Bands (BOLL), Stochastics (STO), Ichimoku (GOC), Directional Movement Index (DMI), Average Directional Movement (ADX), Volume at Time (VAT).

The graph in Figure 1.10 displays the most-preferred indicators, which are a convenient group of studies to be familiar with. The legend lists them in the order of most to least preferred. Please note that the simple moving average (SMA) is most certainly a highly preferred indicator, but it has been excluded because its application is not only for technical use.

Table 1.4 compares the preference of an indicator to the total preference of all indicators of that region. The world column presents the same data as in Figure 1.10 and is listed for ease in comparison. This table answers questions such as “In what order does a region prefer these popular indicators?” It shows that the world as a whole prefers RSI the most, or about twice as much as

**FIGURE 1.10** Most Preferred Indicators



**TABLE 1.4** Comparing Regional Indicator Preferences to All Indicator Preferences

	Americas	Europe	Asia	MESA	World
RSI	46.1%	45.1%	39.4%	50.1%	<b>44.4%</b>
MACD	20.0%	23.2%	23.2%	20.6%	<b>22.0%</b>
BOLL	11.7%	12.8%	11.4%	9.9%	12.0%
STO	10.3%	9.3%	8.0%	8.7%	9.3%
DMI	4.2%	5.0%	5.6%	6.1%	4.9%
GOC	2.5%	2.8%	<b>10.8%</b>	2.6%	4.5%
VAT	<b>5.3%</b>	1.8%	1.6%	2.0%	2.9%
Total	100%	100%	100%	100%	100%

it prefers MACD. The Americas favor volume at time (VAT) over DMI and Ichimoku. It also shows that Asia prefers GOC over DMI and STO.

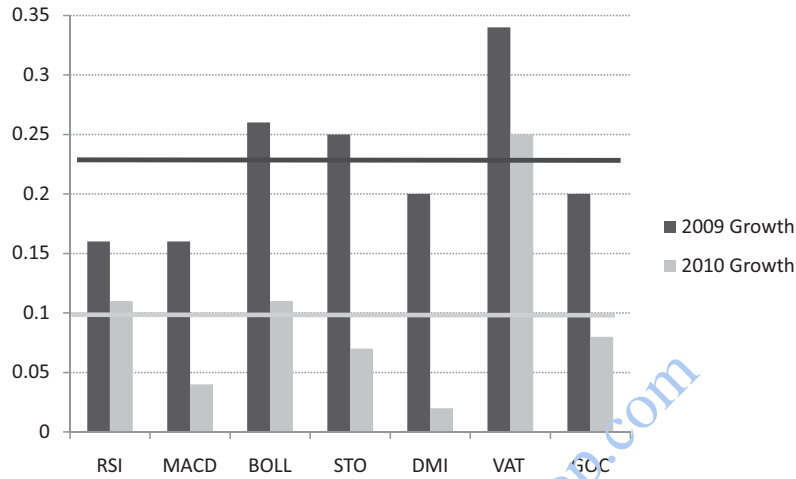
Table 1.5 displays how much a specific indicator is preferred in a particular region relative to the indicators' total preference worldwide. Although Table 1.4 showed RSI as the most-used indicator, it is less preferred by the 44 percent of the sample size in the Americas, about equally preferred by the 38 percent in Europe, is preferred more by the 12 percent in Asia, and much more by the 2 percent in MESA.

Some bigger-picture conclusions we can draw from this table are as follows. First, the preference for almost all technical indicators in MESA is

**TABLE 1.5** Regional Indicator Preferences Compared to Total Indicator Preference

	Americas (44%)	Europe (38%)	Asia (12%)	MESA (2%)	Total
RSI	33.9%	40.5%	20.2%	5.3%	100.0%
MACD	29.6%	42.0%	23.9%	4.4%	100.0%
BOLL	31.8%	42.6%	21.7%	3.9%	100.0%
STO	35.9%	40.0%	19.6%	4.4%	100.0%
DMI	27.9%	40.4%	25.9%	5.8%	100.0%
GOC	18.2%	24.6%	54.4%	2.7%	100.0%
VAT	59.0%	25.3%	12.4%	3.3%	100.0%

**FIGURE 1.11** Growth Rates of Popular Technical Indicators Adjusted for User Growth



more than double its sample size. This shows a strong overall preference for technical indicators in this region. Asia's preference for technical indicators substantially outperforms its sample size, but not as much as MESA. Europe's preference for the top five technical indicators is slightly more than its sample size. The Americas substantially underperform in all categories except VAT.

Figure 1.11 displays the overall growth in indicator use in 2009 and 2010 and is normalized for changes to sample size. This answers a question such as "What indicators are market participants preferring more often?" The average growth of technical indicators over these two years is quite substantial. Their preference on average grew 23 percent in 2009 and another 10 percent in 2010. Interestingly, the most-preferred study, RSI, had double-digit growth rates for both years. Of all the studies, preference for RSI, VAT, and BOLL grew more than average during both years.

Table 1.6 is displaying the preference of the other six studies in terms of RSI. We already know the order of the most-preferred studies but this table addresses a question like "What indicator does a region prefer in addition to RSI?" For example, Asia prefers MACD 59 percent of the time that RSI is preferred, which didn't stand out nearly as much in the other tables. Europe prefers MACD about half of the time, and the Americas and MESA prefer it about two fifths of the time. MESA's lack of preference in STO is emphasized here. Further confirmation for the Americas' preference for VAT and Asia's preference for GOC is also provided.

**TABLE 1.6** Indicator Use in Terms of RSI

	Americas	Europe	Asia	MESA	World
RSI	100%	100%	100%	100%	100%
MACD	43.4%	51.4%	58.7%	41.0%	49.6%
BOLL	25.3%	28.4%	29.0%	19.7%	27.0%
STO	22.3%	20.7%	20.4%	17.4%	21.0%
DMI	9.2%	11.1%	14.2%	12.1%	11.1%
GOC	5.5%	6.2%	27.3%	5.2%	10.1%
VAT	11.4%	4.1%	4.0%	4.1%	6.6%

In conclusion, of these findings, the following are some of the general preferences of the market participants utilizing the Bloomberg Professional Service.

- Asia strongly prefers candle charts, then line charts.
- MESA has a relatively strong preference for candle charts, although not as strong as Asia's, and then it prefers line charts.
- The Americas prefer line and bar charts, but overall have less preference for other charts and indicators.
- Asia prefers GOC and tends to complement it with MACD.
- Europe uses all chart types and indicators and has the largest representation of chart preference. It also has the most preference for log scale charts.
- The Americas prefer VAT.
- MESA's preference for indicators is very high when compared to its sample size.

Growth in technical indicator preference is strong and in fact was one of the driving factors in producing this book to discuss newer and more advanced technical indicators.

The rest of this chapter reviews the generally accepted methods for using these technical indicators.

### Applying the Most Popular Technical Indicators

I have used the technical indicators discussed here for many years and through study and experience I feel I have come to understand their movements very

well. This is something I highly recommend to all readers, as it will increase your confidence in using them as part of an investment decision-making process. Having spent a significant amount of time discussing indicators with market participants, I've come up with succinct yet informative descriptions to explain their workings. Once you've read about the indicators, refer to the box presented further on in the chapter, titled "Generally Accepted Rules for Popular Indicators."

### **Relative Strength Index**

The *relative strength index* is usually referred to as a momentum indicator or oscillator. It is called "relative" because the calculation compares the average size of the up-days to the average size of the down-days over a specified timeframe. For example, if we analyze the price change of a security for each of the past 14 days and notice that price went up \$1.00 ten times and down \$0.25 four times, we can quickly and easily say that price went up \$10 and down \$1, or that on average it went up more than down. In reality, we cannot quickly and easily see this on a chart, nor can we compare it historically. This is the relationship that the RSI is extracting from market actions on a rolling basis, but is not the exact calculation.

The indicator is scaled onto an axis that has a low of 0 and a high of 100. Usually by default, horizontal lines are drawn at 70 and 30 to signify momentum in the upward and downward direction, or what is commonly referred to as *overbought* and *oversold* respectively. It is also important to point out that an RSI level of 50 signifies equal performance of up-periods versus down-periods. The most common look-back period for RSI is 14. Some prefer 9 or 21, and I've seen some go as low as 3 and 5.

RSI is traditionally interpreted as "Sell when overbought and buy when oversold." This interpretation can be meaningful primarily in range-bound markets with areas of predefined support and resistance. It is important for RSI to confirm the direction of price. If price and RSI fail to confirm each other near support or resistance or during breaks of these levels, a change in trend may be near. We can define confirmation as new highs or new lows in both instruments at approximately the same time.

If RSI travels above 70 while price fails to break resistance, you may choose to be bearish in anticipation of a pullback because high levels of momentum did not lead to price breaking resistance. Alternatively, if price pierces resistance but RSI does not reach overbought, momentum is not behind the new highs so you may choose to be bearish.

The opposite would be true for a bullish view. When RSI travels below 30 and price is holding above support, you might choose to be bullish because large downside momentum did not force a break of support. Alternatively, when RSI is above 30 and price pierces support you may choose to be bullish because momentum to the downside is not strong and the break of support may only be temporary.

Volume analysis is very complementary to these methods of using RSI. If volume is light near resistance or support, it suggests market participants have finished pushing price in that direction. There will be more discussion of volume later.

RSI in a trending market is viewed differently. When a market is trending, all we want to know is if it's going to continue or reverse. If the overall trend is down and RSI reaches an overbought reading, the trend may be changing to an upward direction. The start of a trend change usually appears like sideways movement. Therefore the rally that occurred in the downtrend to cause the overbought reading is likely to at least partially correct itself because the market isn't fully confident in a change in trend yet. A trend change can be confirmed if RSI stays above oversold in the correction and when price starts to break resistance or set higher highs.

RSI analysis can be more complex than what was just discussed. Another way to interpret RSI is to identify periods of divergence. Divergence acts as a warning sign that the trend may be changing. Bearish divergence (an opportunity to sell) occurs when price is making higher highs and RSI is making lower highs. Bullish divergence (an opportunity to buy) is the opposite, when price is making lower lows and RSI is making higher lows. The reason bearish divergence is a warning sign of a change in trend is because price is getting more expensive, but it is doing so at a slower rate. Market participants are still pushing price higher but not as fast as they were when price was cheaper.

Finally, it is fairly common for RSI to be biased to the larger trend for that security and the overall market. During uptrends, the RSI level tends to become more overbought and less oversold. During downtrends, the RSI line tends to become more oversold and less overbought. Therefore, in uptrends you could anticipate the overbought level to be more like 75–80 and oversold levels to be 35–40. In downtrends you could anticipate overbought levels of 55–60 and oversold levels of 20–25. These levels are a rule of thumb. What is important is that when you use RSI, you start seeing the transition of RSI levels in a downtrend to RSI levels in a range to RSI levels in an uptrend. The violation of these levels is alerting and confirming to a change in the behavior of trend. Let's take a look at an example of both divergence and overbought/oversold bias.

In Figure 1.12 there are seven zones to discuss where price and RSI movements depict trend direction. In zone 1, price is in a downtrend and is being coffered lower by a downward-sloping resistance line. Price set four lower lows while RSI made three higher lows and did not get oversold on the fourth low (and was only .37 below the third low). This tells us price is reaching the lowest levels in a long time but at a slower and slower rate. Bullish divergence had presented itself and warned of a potential bottom.

In zone 2, price breaks above the downward sloping resistance line but RSI fails at 60, the overbought level for a downtrend. In zone 3, price stays above the lows of zone 1 and RSI reaches 34, which is closer to oversold in an uptrend than a downtrend. June, July, and August is starting to look more and more like a range-bound market, or a double bottom, than a downtrend, as RSI stays above 30 and below 70.

In zone 4, price breaks the range-bound highs and RSI breaks above 60 and then through 70, confirming the uptrend. All RSI lows between zone 4, 5, and 6 are above the oversold level of 40; in fact they are at least 45, or showing very bullish momentum. In zone 6, price has a huge thrust to the upside with RSI exceeding 80. Price continued to higher highs after that, but RSI did not reach overbought, showing lack of momentum into higher prices. Price and momentum were diverging, bearishly, warning that price may be forming a top.

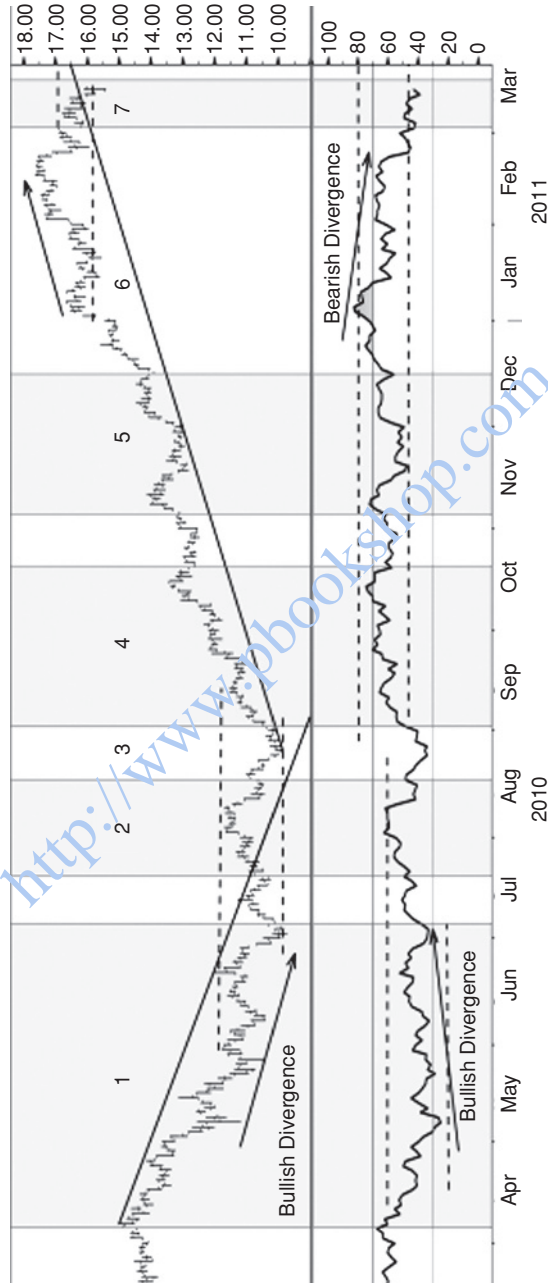
In zone 7, RSI crossed below 45 for the first time in a long time while price broke down through multiple support levels. We can look for one of two situations to occur that will specify a change in trend from up to sideways. The first is if price continues to decline and RSI reaches 30–35. The second would be if price moves higher and fails to exceed the prior highs of 17–17.50, all while RSI does not exceed 60 (the overbought level for a downtrend).

### **Moving Average Convergence/Divergence**

Also known as MACD, *moving average convergence/divergence*, this indicator falls in the trending category of studies mostly because it is based on moving averages. By design, trending studies will experience some lag in their signals, so they are best when used to confirm signals from other indicators. Something that is noteworthy about MACD and perhaps contributes to its popularity is that it weights the most recent data points more, or exponentially calculates to reduce its lag.

The default settings for this study across all systems are largely the same. The MACD1 line is the spread between the 12- and 26-period exponential

**FIGURE 1.12** Alcoa, Inc., with Examples of Bullish and Bearish RSI Divergence and Multiple Overbought and Oversold Levels



moving average. The signal line is the 9-period exponential moving average of the MACD1 line. I find that very few people actually change these periods. Hopefully this explanation will encourage you to experiment. In Chapter 2, by Julius de Kempenaer, you'll see that he prefers the spread between the 10- and 30-week moving averages. Interestingly enough, almost everyone seems to keep the signal at a period of 9.

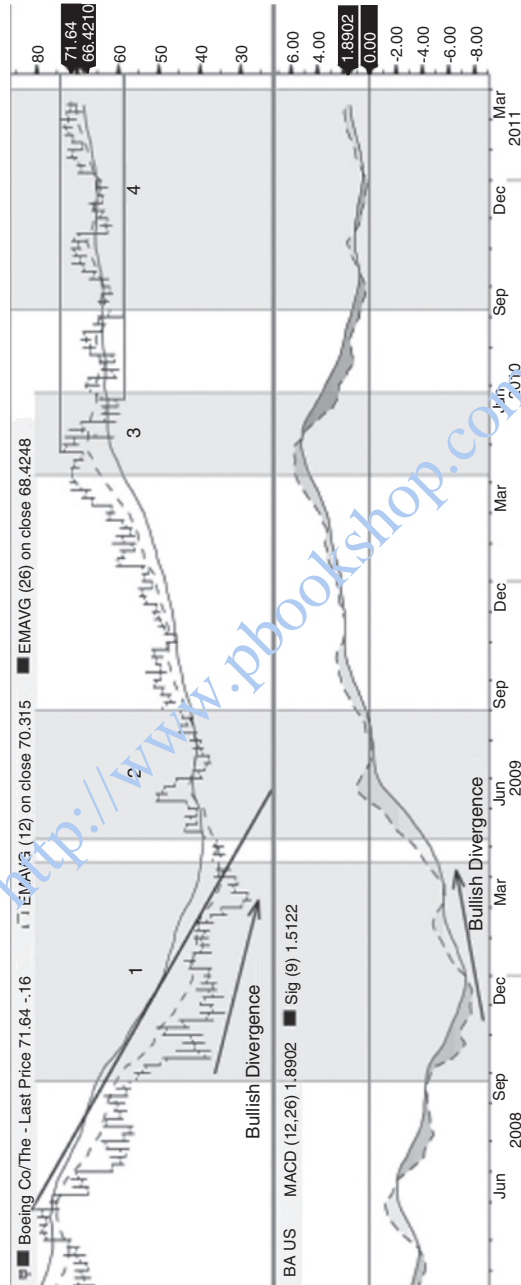
This produces an indicator that will oscillate between a positive and negative value. A rule of thumb for many indicators is that when the value of a line in an indicator turns positive, it is bullish, and when it turns negative, it is bearish. A second rule of thumb to consider is that when a faster-moving line (in this case the MACD1 line) crosses above a slower-moving line (signal), a buy signal has occurred, and when a faster-moving line crosses below a slower-moving line, a sell signal has occurred. Remember, these are rules of thumb, not guarantees.

In Figure 1.13 there are two exponential moving averages on the price chart. The dashed line is a 12-day average and the solid line is a 26-day average. Below that is the MACD indicator where the MACD1 line is dashed and the signal line is solid. According to the legends, the EMAVG (12) is 70.315 and the EMAVG (26) is 68.4248. The 12-day average minus the 26-day average equals 1.8902, which is equal to the MACD1 line in the bottom panel. If the shorter-term average is less than the longer-term average, the MACD1 line value will be negative. If the shorter-term average is greater than the longer-term average, the MACD1 line value will be positive. Therefore, the MACD1 line is visualizing the crossing of the exponential moving averages on the price chart.

The other component of the MACD indicator is the signal line. This line is plotted to trail or smooth the MACD1 line for two reasons. First, it allows the indicator to generate earlier signals of a potential change in trend. It provides earlier sell signals when the MACD1 line crosses below the signal line and earlier buy signals when the MACD1 line crosses above the signal line. Considering where these crosses occur is important. The MACD1 line crossing below the signal line while positive is an early sell signal. If the MACD1 line crosses above the signal line while positive and far from the zero line, a buy signal has not occurred because the trend is already very bullish. Second, the signal line confirms a trend change when it turns into a positive or negative value after the MACD1 line turns.

Last, the slope of the MACD1 and signal line—positive, negative, or transitioning—can have a bearing on the overall direction of trend. In situations shown in zone 2 of Figure 1.13, you'll see how this can become important.

**FIGURE 1.13** Moving Average Convergence/Divergence Example: Boeing Company



In Figure 1.13, four zones have been highlighted to provide an example of how the indicator works. In zone 1, price is in a downtrend as defined by the resistance of the downward-sloping trend line and the 12-day exponential moving average. As price reaches lower lows in March 2009, MACD makes higher lows. This can be considered bullish divergence, as we discussed in the RSI example. I find that fewer people consider divergence on MACD, but I have come across some who do. In this instance, the divergence between MACD and price means the rolling spread between the two moving averages of price has become smaller despite price going lower. In other words, the moving averages are closer to a bullish cross than at the last low in price, and now price is even lower.

In the transition from zone 1 into zone 2, price broke above the trend line and both moving averages. In the center of zone 2, the MACD1 line turned positive. If you were using just the moving averages on price, you may have been concerned because price dipped below them and then they bearishly crossed. Deeper interpretation of the MACD can help in situations like this. The MACD1 line did not cross the signal line and it hovered at, and to just below, the zero line. Most important, it stayed above the signal line and the signal line maintained a bullish direction, or a positive slope. At the end of zone 2, the signal line turned positive.

In zone 3, price had its first bearish signal in the uptrend, which is represented by the MACD1 line crossing below the signal line. From zone 3 to the end of the chart a range-bound market formed where defined support and resistance is present, at about \$58 and \$74 respectively.

In zone 4, the moving averages on price turned flat or sideways and the MACD1 and signal line took a dive, coming very close to the baseline (or zero). At this point we can still consider the trend as up. For it to continue, we will need to see price close above prior highs of \$74.22, and the MACD lines to be pointing higher (positive slope). If price breaks below \$58.78, the MACD lines will likely have turned negative already and a downtrend will be present.

### **Bollinger Bands**

In basic theory, the Bollinger Bands study attempts to point out overbought or oversold markets. It does so by calculating a moving average of price and measuring two standard deviations above and below it. The traditional application will measure two standard deviations above and below a 20-period moving average. Therefore, in general terms, price should be inside of these bands about 95 percent of the time.

The generally accepted signals are to sell if price closes above the upper band (+2sd) and buy if price closes below the lower band (-2sd). In doing so, a market participant expects price to revert to the mean, which is where he or she would exit the trade.

Because of the chosen method of calculating this study, the distance between the bands will vary. Narrower bands signify a low-volatility market, or a smaller average dispersion of data points. Wider bands signify a more volatile market, or a larger average dispersion of data points. Knowing which scenario to trade and how to do it is important.

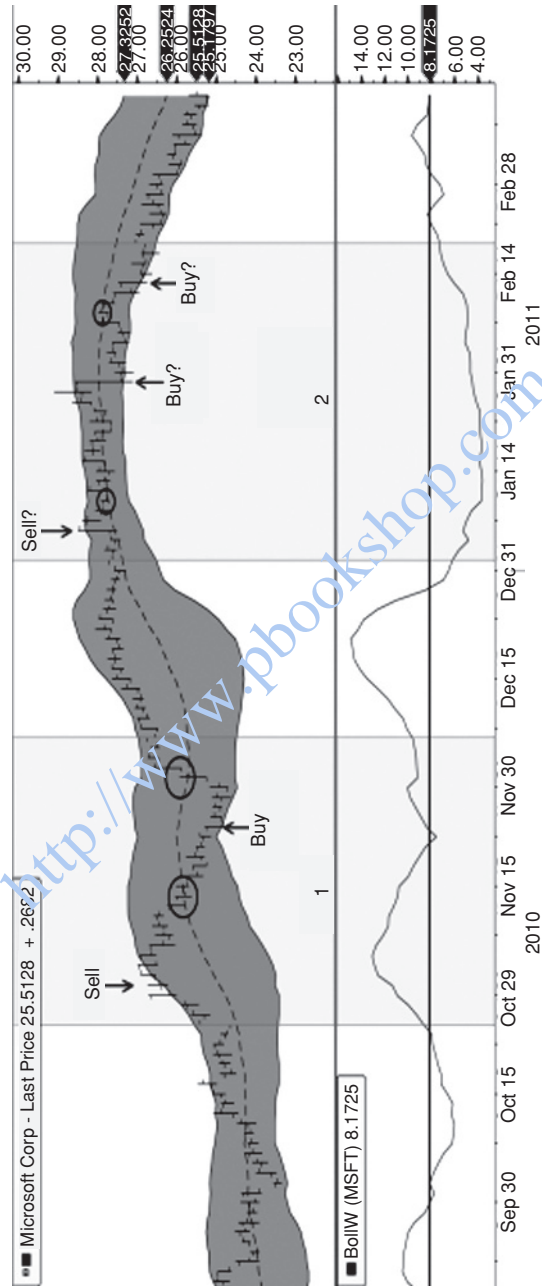
From my experiences, wider bands offer better opportunities than narrow bands for a mean reversion trade. Narrow bands are more useful for determining the future direction of trend. In Figure 1.14, there are two shaded zones, zone 1 and zone 2. There is also a derivative of the Bollinger Band in the lower panel called *bandwidth*. The bandwidth is a measure of how far apart the upper and lower deviation bands have been. The horizontal line drawn on the bandwidth is an average of the bandwidth over that timeframe. This tells us if the security is experiencing high or low volatility on a relative basis. A regression line or average line with standard deviations could be applied as well.

Zone 1 is an ideal situation for a mean reversion trade. The arrow points to a bar and is labeled “Sell” where price closed above the upper band. Notice the bar before it opened above it but did not close above it. The level of the close is most important in this scenario, and in many other indicators. The day after the sell bar, price actually crept slightly higher, but then reverted to the mean, providing a gain of \$0.67. This was an ideal situation to sell because the bandwidth was well above the average and price traded above the upper band the day

There is also a “Buy” signal in zone 1. This signal wasn’t as ideal as the sell signal because the bands were at average distance. You may notice when the bandwidth is average to wide, price tends to *ride the band* for just a couple of periods. So the first break or test of the band is likely followed by another. If you were going to buy at that point on the chart, you waited through four periods of sideways movement for price to revert higher. If you were long, it was encouraging to see that price never closed below the close of the buy bar. Then price reverted to the mean for a gain of \$0.91.

Zone 2 is an application I see or hear less of than the one shown in zone 1. The concept of low volatility suggests a pause in the prior direction of trend. Essentially, investors are done chasing price higher or lower and price begins moving sideways. Price doesn’t move sideways forever. Therefore the identification of narrow bands over a period of time combined with a

**FIGURE 1.14** Bollinger Bands: Microsoft Corporation



breakthrough of those bands suggests a new direction of trend, not a mean reversion trade. That trade will likely come again a little later after volatility, or a greater-than-average bandwidth, returns.

In zone 2, there is an arrow pointing to a bar marked “Sell?” At that point in time, the bandwidth was very narrow. Since price was in an uptrend and volatility declined, suggesting a pause or potential reversal in trend, it is not advisable to sell because the profit opportunity is much less than the zone 1 examples because the moving average is closer to the deviation bands. The next arrow in zone 2 says “Buy?” The same logic can be applied here. The bands are narrow, there is low volatility to profit from, and we’re uncertain if price is forming a topping or continuation pattern.

Toward the end of zone 2 is a second “Buy?” point. Once you see price setting lower lows and the bandwidth rising above average, a new trend is likely beginning, in this instance to the downside. In this scenario you could attempt to sell the riding of the lower band to profit from the continually expanding volatility. The “riding of the bands” mentioned earlier tends to occur for longer timeframes when bands go from narrow to expanding. You could also wait for a few volatile bars where price gaps below the two-standard-deviation band while bandwidth expands and consider a mean reversion trade like zone 1.

## Stochastics

*Stochastics* (STO) is a momentum study similar to RSI. It oscillates between 0 and 100 and has overbought and oversold levels that are typically set at 80 and 20. The indicator has one line that calculates the actual stochastic and then three additional lines that smooth the stochastic repeatedly. These lines are called %K, %D, %DS, and %DSS respectively. For some undisclosed reason, the calculations of this study on multiple charting applications differ from one another. According to the Bloomberg Professional Service, the %D and %DS, or the once- and double-smoothed stochastic, tend to be the go-to series of the indicator, so we will focus our discussion on these.

The goal of the study is to tell a market participant if price is closing closer to the highs or lows over time. As you can imagine, in an uptrend we would expect price to be closing closer to the highs, and in a downtrend closer to the lows. Therefore, the turning down of the stochastic while overbought and crossing back into the neutral zone (below 80) is a bearish signal. The turning up of the stochastic while oversold and crossing back into the neutral zone (above 20) is a bullish signal. Divergence, as discussed with RSI and MACD,

can most certainly be applied to the stochastic indicator and is something Cynthia Kase delves into further in Chapter 4.

Figure 1.15 displays the previously discussed signals. Zone 1 is a classic signal of *bearish divergence*. The %D and %DS lines stayed overbought for quite some time and finally began diverging from rising price. When the %D and %DS lines both exited overbought territory, or crossed below 80, is also when the bearish divergence was confirmed.

Zone 2 just barely had a buy signal from the stochastic lines as the %D reached 17 and the %DS reached 20. It is ideal to question signals like this until a clearer, more opportunistic situation appears, like the *bullish divergence* that occurred right after it.

Zone 3 had a few signals going on. Price broke above a downward-sloping trend line and the highs of the prior consolidation. You may have noticed that this is a candle chart, which allows us to apply *candle pattern theory*, an important part of interpreting market actions. During the three trading days after the break above the prior consolidation highs, three doji candles appeared. (A doji candle represents market participant indecision and balance between supply and demand. The buyers balance out the sellers and vice versa. It signals a pause in the prior trend.)

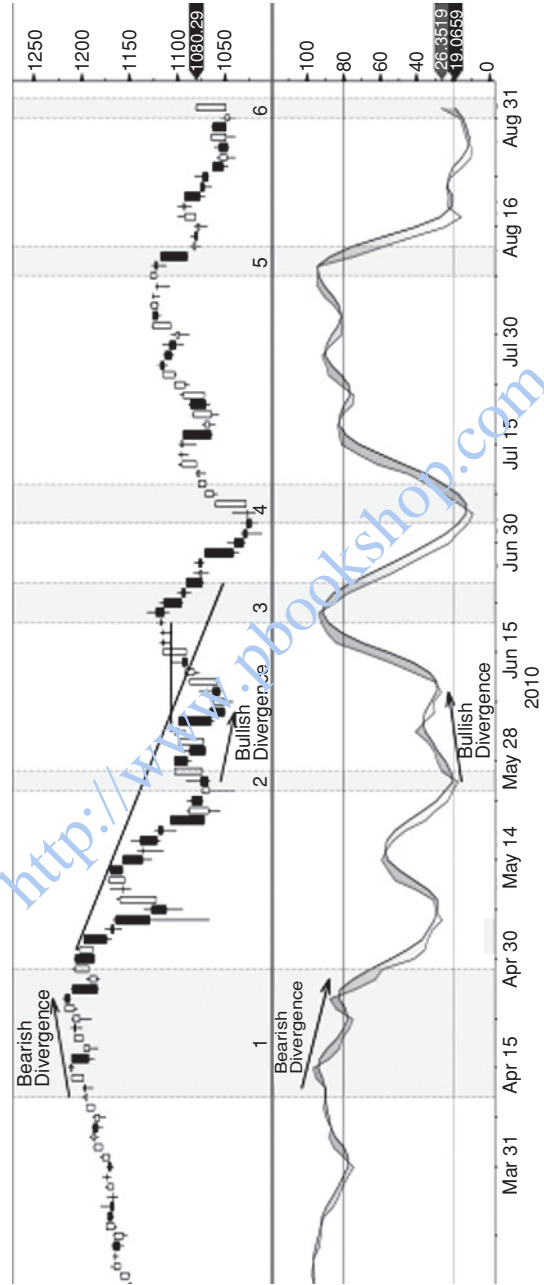
The first candle in zone 3 gapped higher at the open and closed lower on the day, engulfing the prior doji candle, or forming a *bearish engulfing pattern*. This pattern is a trend-reversal signal because the current day's trading activity completely reversed throughout the course of the day and turned yesterday's indecision to bearish by closing lower. Therefore, the bullish trend line break and the highs above the prior consolidation highs were being reconsidered. The second candle in zone 3 caused a bearish cross of the stochastic lines and shortly thereafter they crossed below 80, providing a sell signal. If candle pattern analysis is of interest to you, I would strongly suggest you review the recommended readings at the end of this chapter.

In zone 4, price formed a long-legged doji and then reversed to the upside. In zone 5, we received a sell signal from a possible position taken from zone 4. Zone 6 is another example of a standard buy signal.

### Directional Movement Indicator

The *directional movement indicator* (DMI) falls into the category of a trending study. The calculation is somewhat in-depth, so I've come to explain it as follows. In an uptrend, we should expect price to make higher highs and higher lows. In a downtrend, we should expect price to make lower lows and lower highs. The mapping of this relationship over time is more or less the

**FIGURE 1.15** Stochastics on the S&P 500



goal of the +DMI and –DMI lines, which represent up movement and down movement, respectively. In theory, if the +DMI is greater than the –DMI, it is bullish. If the –DMI is greater than the +DMI, it is bearish. We can't jump to these conclusions, however, until we consider the *average directional movement* (ADX).

Derived from the +DMI and –DMI lines, the ADX line suggests that the market is trending in the direction of the greater DMI line if it is above 25. If it is below 25, it suggests that the trend is weak or range bound. If the ADX comes from 15 to 23, a trend could be developing. If the ADX goes from 32 to 25, the trend may be coming to an end.

Figure 1.16 displays the DMI and ADX indicator together. The solid line is the +DMI, the dashed line is the –DMI line, and the thick dotted line is the ADX. Prior to zone 1 there is a range-bound market as price was not making consistently higher highs or lower lows and the ADX line was below 25.

In zone 1, price declined below the range-bound lows and a downward-sloping trend line began. The –DMI continued to rise while the +DMI continued to fall. Then at the end of zone 1, the ADX confirmed a downtrend in progress when it rose from 16 to above 25.

In zone 2, price tested the downward-sloping resistance line and failed. At the same time, the ADX line went below 25, suggesting that the prior downtrend was ending (this does not necessarily mean reversing).

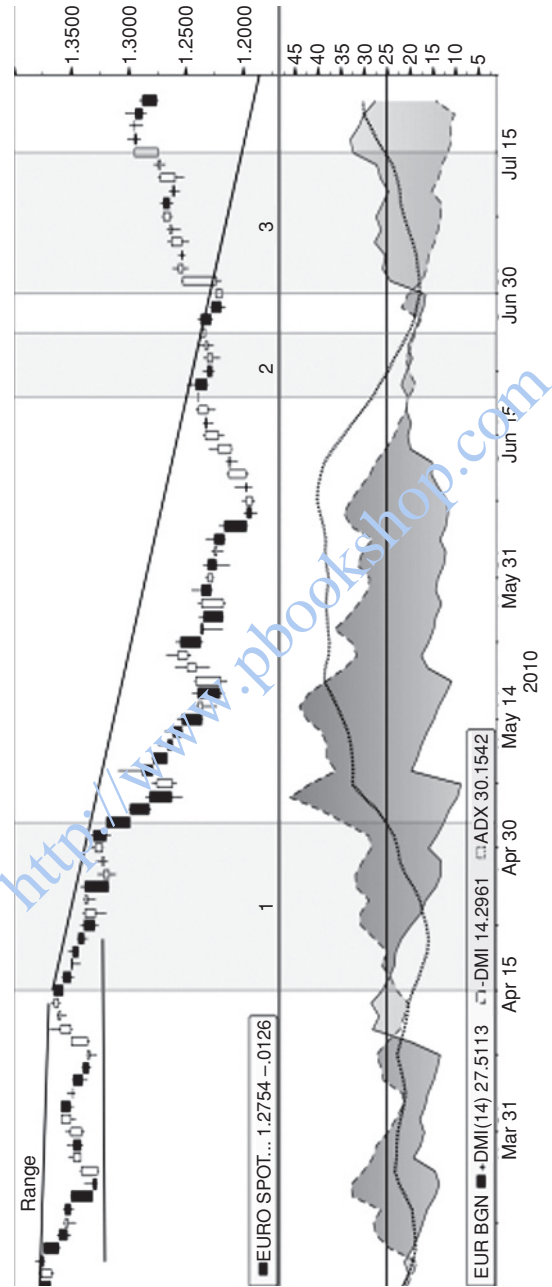
In zone 3, price broke above the trend line and the +DMI began rising while the –DMI line was falling. Shortly thereafter, the ADX line crossed above 25, confirming the trend had turned to up.

## Ichimoku

The sixth-most-preferred technical study, and the one that is most often used in Asia, is *ichimoku*. This study can be classified as a trending study because its calculations are primarily averages. It is comprised of three parts. The first part is the *conversion line* and *base line*. The second part is the *cloud*, which is made up of two lines named *leading span 1* and *leading span 2*. The third part is the *lagging line*. Note also that candle pattern analysis is essential in *ichimoku* charting.

The first four lines mentioned are averages of price, but not moving averages. The conversion line is typically the midpoint of the highest high and lowest low over the past nine periods. The baseline is typically the midpoint of the highest high and lowest low over the past 26 periods. The calculation

**FIGURE 1.16** Directional Movement Indicator Applied to the Euro



will roll in the same way that a moving average does but will only consider those defined points.

Leading span 1 is the midpoint of the base line and the conversion line plotted 26 periods forward on the chart. Leading span 2 takes the midpoint of the highest high and lowest low of twice the period of leading span 1 and plots it 26 periods forward. These two lines form the cloud on the chart.

The cloud is an integral part of the indicator. The direction of the cloud into the future suggests the overall direction of trend. When it is thick and sloping down, it indicates a bearish trend. When it is thick and sloping up, it indicates a bullish trend. The thickness of the cloud suggests the amount of support or resistance present when price is trying to break through it. When it is thin, price stands a better chance of breaking through it. The inversion of the cloud is important to confirming a change in direction of the prior trend. When leading span 1 crosses above leading span 2, it is bullish, and when it crosses below, it is bearish.

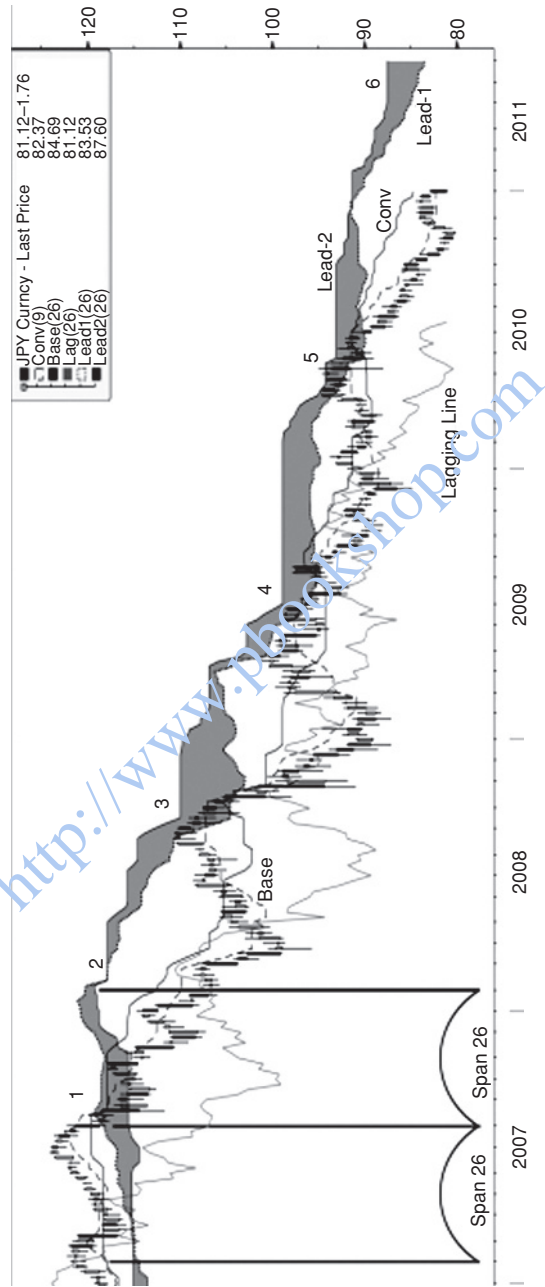
The intersection of the conversion line and base line is important for trend change signals. A bullish signal occurs when the conversion line crosses above the base line. A bearish signal occurs when the conversion line crosses below the base line. These lines are subject to support and resistance of the cloud. A good confirmation of a change in trend is when these lines follow price through the cloud.

Last to examine is the lagging line. This line is the current price plotted 26 periods prior. It allows us to quickly and easily see if today's price is greater than or less than it was 26 periods ago. If the lagging line is above price, it means price today is greater than price then, so it is bullish. If the lagging line is below price, it means price today is less than price then, so it is bearish. The candle pattern formations of today versus the patterns where the lagging line falls can be taken into consideration. The lagging line is also subject to support and resistance at the cloud.

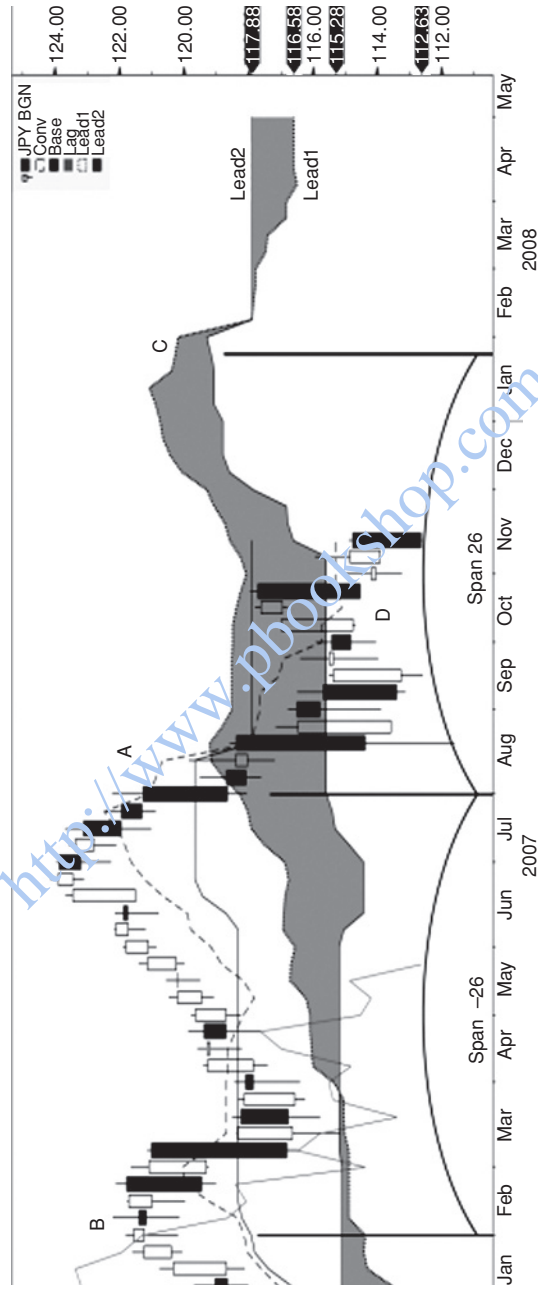
Figure 1.17 displays a five-year period during which the Japanese yen was strengthening against the U.S. dollar and shows the power of the resistance from the cloud at points 3, 4, 5, and, in theory, 6. Point 1 presents multiple indications that signaled the start of this trend. I've annotated where 26 bars prior to and after the point exist so that we can orient ourselves with the information we were seeing during that time. Remember, the cloud is pushed forward 26 periods and the lagging line is pushed back 26 periods. Let's look at Figure 1.18, which gives a more detailed image of the trend change that occurred in 2007.

At point A, price made a strong move lower, breaking below the conversion and baselines, and found support at the top of the cloud. At this point,

**FIGURE 1.17** Ichimoku Indicator on the Japanese Yen



**FIGURE 1.18** The Strengthening Yen and the Weakening US\$ Lead to a Trend Change of the Popular Cross in 2007



we can look forward and backward on the chart to see what the leading and lagging lines are doing. At point B, the lagging line crossed below price, indicating that current price was less than it was 26 periods prior. Some would consider the two candles at point B, a hanging man and a long-legged doji, as additional bearish signs because price stalled at these higher lagged levels. At point C, the leading spans (cloud) were narrowing and very close to a bearish cross. These components were not encouraging signs for the currently wide or supportive cloud at point A.

A couple of periods to the right of point A, price made a fast move down, breaking through the bottom of the cloud, or breaking support. Two more bearish indications happened at this point. The first was the bearish cross of the conversion line and baseline. The second (Point C) was leading span 1 crossing below leading span 2.

At point D, the top of the cloud provided resistance while price attempted to break back above it. In that attempt, the baseline was adding to the strength of resistance and the conversion line bearishly exited down through the cloud. When price closed below the cloud just to the right of point D, the trend was confidently down.

### Volume at Time

The last of the seven most popular studies is not applied to a price series of a security, as the rest of the studies are. *Volume at time* (VAT), as the name implies, is applied to the volume of a security that has been traded. Unlike a moving average, VAT is sensitive to the historical volume for that time period. It works differently on a daily chart than an intraday chart, so we will discuss both. But first we will discuss the generally accepted rules for analyzing price and volume together.

Volume is most prevalent in the equity, options, futures, and commodity markets. It represents the number of shares, the number of contracts, the number of barrels, the number of anything that has changed hands on a given day, or week, or even hour or minute. It can be described as a measure of market liquidity, the level of demand for a security, or a measure of momentum. It represents the amount of interest market participants have in a security. High levels of volume suggest an increased interest, while low levels of volume suggest a decrease or lack of interest.

As a measurement, volume alone is not as useful as it can be when compared to, for example, an average. If you're looking at a daily chart of price and volume, you might consider applying a 5-day, 20-day, and/or a 60-day average, giving you the rolling one-week, one-month, and three-month

comparison. When looking to confirm a change in trend, you can then compare the actual volume data to an average or one average to another.

The generally accepted rules for price and volume are as follows.

- Price is rising and volume is rising and/or above average = bullish market; the uptrend is being supported by market participants.
- Price is rising and volume is falling or below average = a warning sign that a top or consolidation of trend is near.
- Price is falling and volume is rising or above average = bearish market; the downtrend is being supported by market participants.
- Price is falling and volume is falling or below average = a warning of a bottom or a consolidation of the trend is near.

For more detailed scenarios to consider when comparing price and volume moves, see Table 1.7 and the corresponding visuals in Figures 1.19–1.21.

#### *Historical Volume at Time*

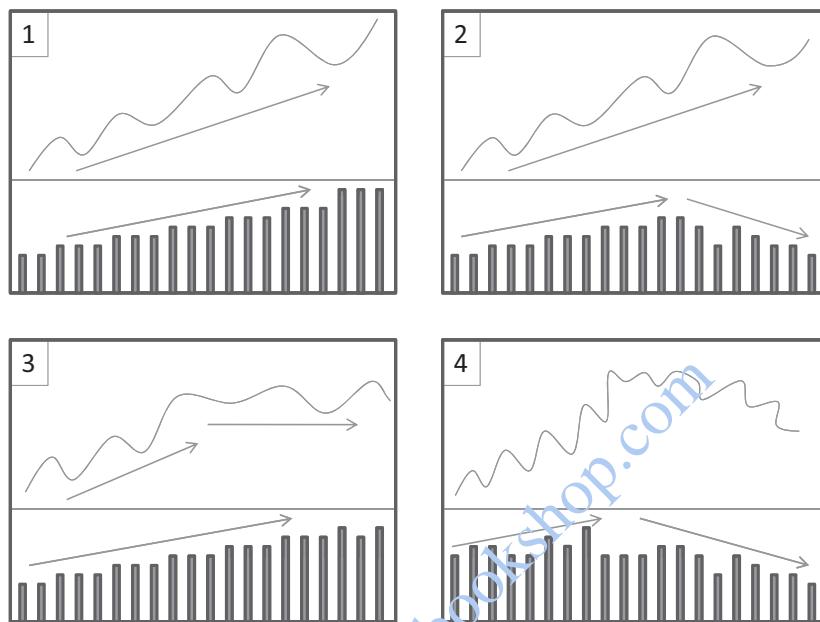
The previous theory of volume can be applied to all timeframes. On a daily chart, a moving average of volume can become unjustly skewed higher or lower due to the volume that occurred over the duration of that average. The older that volume becomes, the less influence it has on estimating trend direction. From a historical perspective, VAT considers the volume that has occurred on that day over the past  $X$  years to create the average for that day. Therefore, it can be considered a seasonal approach to volume analysis. From an intraday perspective, VAT creates an average of volume from the actual volume that occurred during that time-slice for the past  $X$  days. In both applications VAT can be projected into the future to get an idea of expected volume.

Figure 1.22 displays a daily chart of price and volume with a moving average and VAT on the volume histogram. There are four zones that highlight the benefits of using a time-sensitive study like VAT instead of a moving average. In zone 1, price was declining. Volume, when compared to the moving average, was equal to it, suggesting the market was equally interested in the down move. When compared to VAT, the actual volume was at least 50 percent greater and in some instances more than 100 percent greater. VAT was suggesting the market was more bearish in the down move than the moving average. More specifically, the first and second candle in zone 1 formed a bearish engulfing pattern on volume that was twice the VAT, but only equal to the moving average. This is very important information for those applying candle-pattern theories.

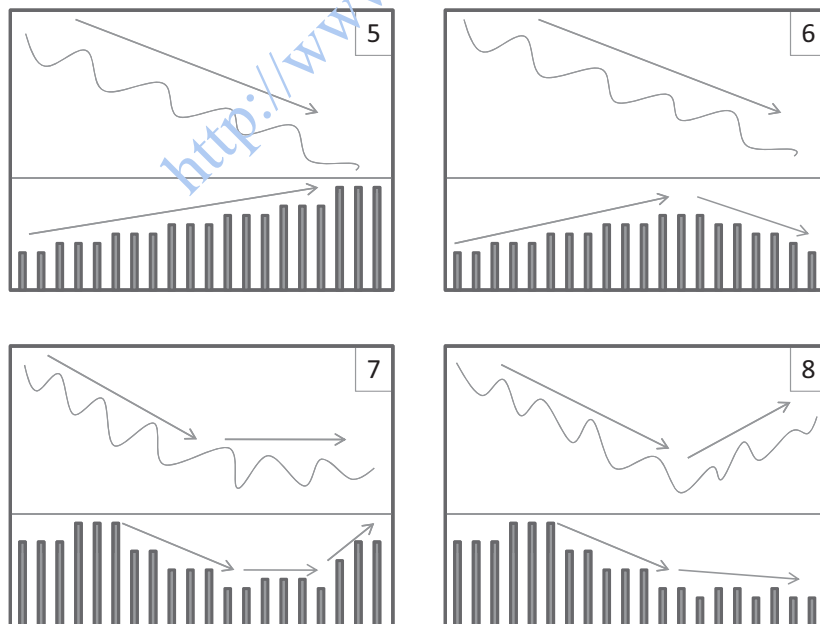
**TABLE 1.7** Deeper Interpretation of Price and Volume Scenarios

Interpretation of Price and Volume Trends					
#	Overall Trend	Price	Volume	Signal	Expectation
1	Up	Setting new highs	At or above average	Bullish	Price setting higher highs/lows and breaking resistance
2	Up	Testing highs	Light/declining	Topping point, consolidation near	Consolidation of prior trend
3	Up	Sideways	Above average	Distribution, potential top	Look for support to hold; if it fails, a change in trend is likely
4	Up	Drifting lower	Light	Some distribution, consolidation	Look for a continuation or reversal price pattern
5	Down	Setting new lows	At or above average	Bearish	Lower lows/highs, price continues to break support
6	Down	Setting new lows	Light/declining	Potential bottom, consolidation, near	Consolidation of prior trend
7	Down	Sideways	Above average	Accumulation, bullish	Look for a sequence of higher highs/lows breaking resistance
8	Down	Drifting higher	Light	Shorts taking profit, some accumulation	Look for a continuation or reversal price pattern
Interpretation of Volume Spikes During Price Trends					
#	Overall Trend	Price	Volume	Signal	Expectation
9	Up	Gapping up	Spiking higher	Overall bullish	Be careful, too far too fast?
10	Up	No move higher	Spiking higher	Beginning of distribution	Smart money getting out, late money getting in
11	Down	Gapping down	Spiking higher	Early capitulation	Major downtrend occurring, eventual bounce
12	Down	No move lower	Spiking higher	Beginning of accumulation	Potential bottom price pattern forming

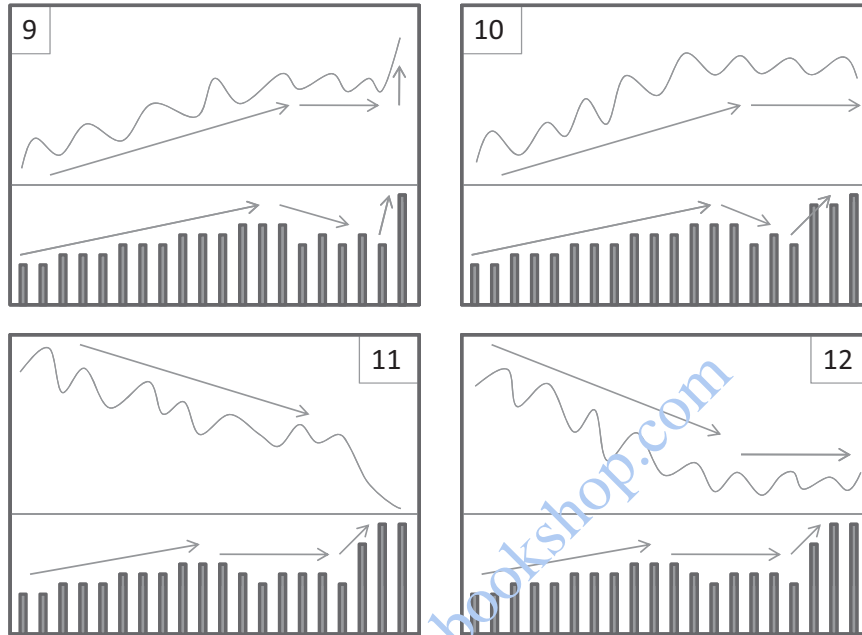
**FIGURE 1.19** Overall Trend Is Up



**FIGURE 1.20** Overall Trend Is Down



**FIGURE 1.21** Interpreting Volume Spikes

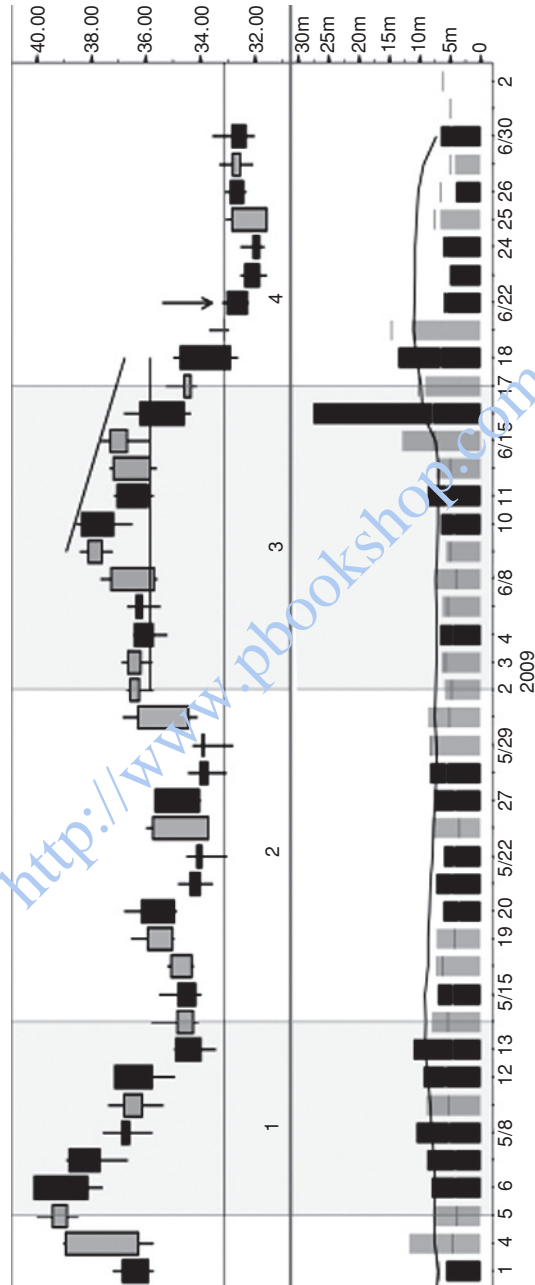


In zone 2, the moving average was skewed slightly higher so that it looked as if volume was light in the sideways move at support of \$33.25. VAT suggested volume was greater than average. Table 1.7 suggests this can mean accumulation in a downtrend, particularly when a support level becomes evident (\$33.26).

In zone 3, volume was less than average and about equal to the VAT levels while price rallied from support and retraced part of the down move in zone 1. The highest high formed another bearish engulfing pattern. The first candle of the pattern had volume that was less than average, but equal to VAT. The second candle had volume that was less than average, but greater than VAT. From the VAT perspective, price on the first candle went up on average volume and the second candle went down on greater-than-average volume. The market was more interested in the selling of the security than the buying of it. This is something we could not see by using the moving average.

Zone 4 highlights the impact of a spike in volume on a moving average versus VAT. The candle that broke support (see arrow on chart) did so on volume slightly greater than VAT, while being half the moving average. Clearly, the skewing of the moving average lessens the impact of its use, when

**FIGURE 1.22** Historical Chart Comparing a Volume Average and VAT



comparing to actual volume. Price then attempted to reverse higher with volume less than VAT and failed at resistance. The final bar had volume greater than VAT, but price still didn't break resistance and it was a down day, suggesting that market participants were still bearish.

It is also worth knowing that VAT can anticipate future volume levels because it can look historically to calculate those averages and plot them into the future. In zone 4, VAT is showing the next two average volume levels.

### *Intraday Volume at Time*

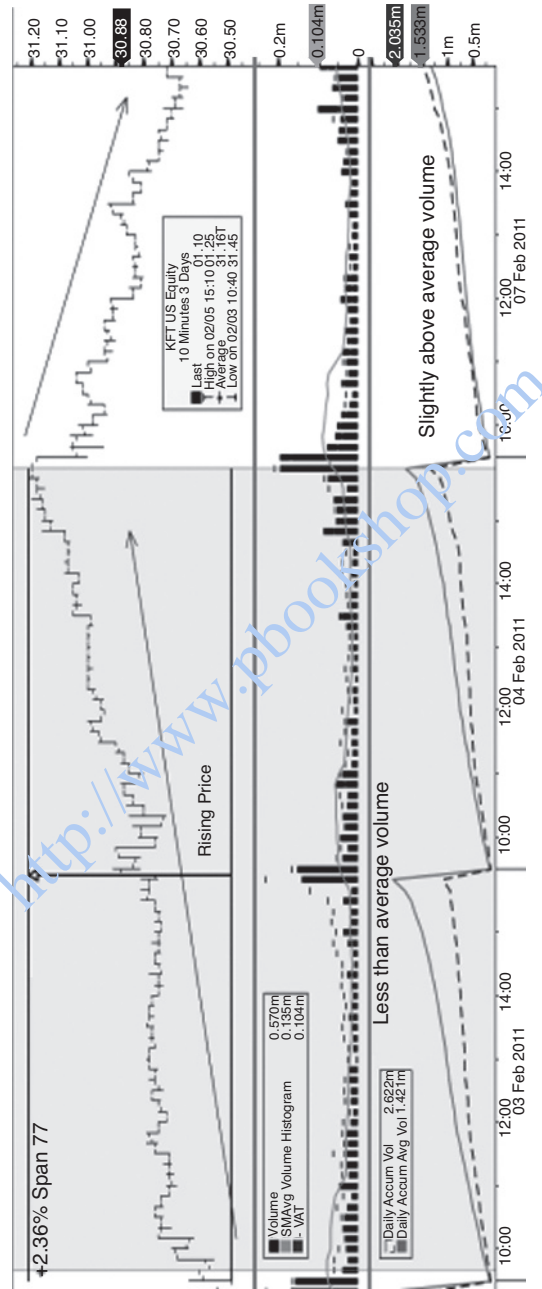
Intraday volume on a chart tends to look like a smile. It is typically heavy at the open, light in the middle of the day, and heavy approaching the close. When you're trading the open, a moving average is calculated from the prior day's closing volume. This is not an apples-to-apples comparison. It makes more sense to compare the volume from the prior morning's open to this morning's open, the prior midday's trading to today's, and the prior end-of-day's trading to today's.

VAT applied to an intraday chart is a time-sensitive average. It shows you the average volume for a specific time-slice over the past  $X$  days. For example, if you're looking at a stock on a 10-minute chart with VAT set to consider the past five periods, it will show you the volume for each 10-minute period and the average volume for that 10-minute period from the prior  $X$  days. If you are looking at the 10:00–10:10 A.M. volume, the VAT level is the sum of the volume for that same time period from the past  $X$  days, divided by  $X$ .

The indicator will display a dashed line on the volume histogram that represents the average volume level for that time-slice. It will also show a second panel that totals the sum of the accumulated volume (AV, solid line) and the accumulated average volume (AAV, dashed line) on the day.

Figure 1.23 shows a three-day, 10-minute chart. During the first two days when price gained 2.36 percent, it did so while AV was less than AAV. Volume was not supporting this two-day rally. During the second day of diverging price and volume, AAV was projected to be lower than the first day. The AV was still less than AAV. In the middle panel, at the end of day 2, the last 70 minutes of trading, or seven bars, had about equal volume but little to no price gains. The next morning, volume was greater than VAT and price declined, kicking off the retracement, with AV slightly greater than AAV.

**FIGURE 1.23** Intraday Chart Comparing a Volume, Average Volume and Volume at Time



### Generally Accepted Rules for Popular Indicators

To help you get to know the indicators discussed in this chapter and to be used as a reference later, I've prepared a cheatsheet of generally accepted rules for each indicator.

#### Relative Strength Index (RSI)

- Bullish = when RSI crosses above 30. Also when price makes lower lows and RSI makes higher lows while exiting oversold territory.
- Bearish = when RSI crosses below 70. Also when price makes higher highs and RSI makes lower highs while exiting overbought territory.
- In uptrends, RSI levels have a bias to the upside.
- In downtrends, RSI levels have a bias to the downside.

#### Moving Average Convergence-Divergence (MACD)

- Bullish = when MACD1 crosses above the signal line. Also when MACD1/signal turns positive.
- Bearish = when MACD1 crosses below the signal line. Also when MACD1/signal turns negative.

#### Bollinger Bands (BOLL)

- Wide Bandwidth: Bullish/bearish when price closes below/above the lower/upper band.
- Narrow Bandwidth: Bullish/bearish when price closes above/below the upper/lower band.

#### Stochastics (STO)

- Bullish = when %D and %DS lines cross above 20. Also when price makes lower lows and % lines makes higher lows while exiting oversold territory.
- Bearish = when %D and %DS lines cross below 80. Also when price makes higher highs and % lines make lower highs while exiting overbought territory.

#### Directional Movement Indicator

- Bullish = +DMI is > -DMI and ADX crosses above 25.
- Bearish = -DMI is > +DMI and ADX crosses above 25.
- Market is considered range-bound when the ADX is under 25.

#### General Overview Chart, Ichimoku: Bullish (Bearish)

- Conversion line crossing above (below) baseline.
  - If these lines cross while price is above (below) the cloud with little downward (upward) fluctuation = bullish (bearish).

- If these lines cross while the closing price is beneath (above) or within the cloud and has shown upward (downward) movement over the past few days = bullish (bearish).
- Closing price is within the cloud with little fluctuation = neutral.
- Lagging span is greater (less) than the lagged closing price = buy (sell).
- Cloud composition: When leading span 1 is above (below) leading span 2, this is a sign of a rising (falling) market. The thicker the cloud, the greater the support or resistance.

#### **Volume Confirmation**

- Bullish = price is rising and volume is rising.
- Weakening uptrend = price rising and volume declining.
- Bearish = price is declining and volume is rising.
- Weakening downtrend = price declining and volume declining.
- Accumulation = spiking volume at market lows.
- Distribution = spiking volume at market highs.

The power of these traditional and preferred indicators is still alive and well today. If you'd like to learn more about them, consider learning directly from the creators. They have certainly been leaders in the evolution of technical analysis and their work should be recognized and reviewed. See the Recommended Reading section at the back of this book.

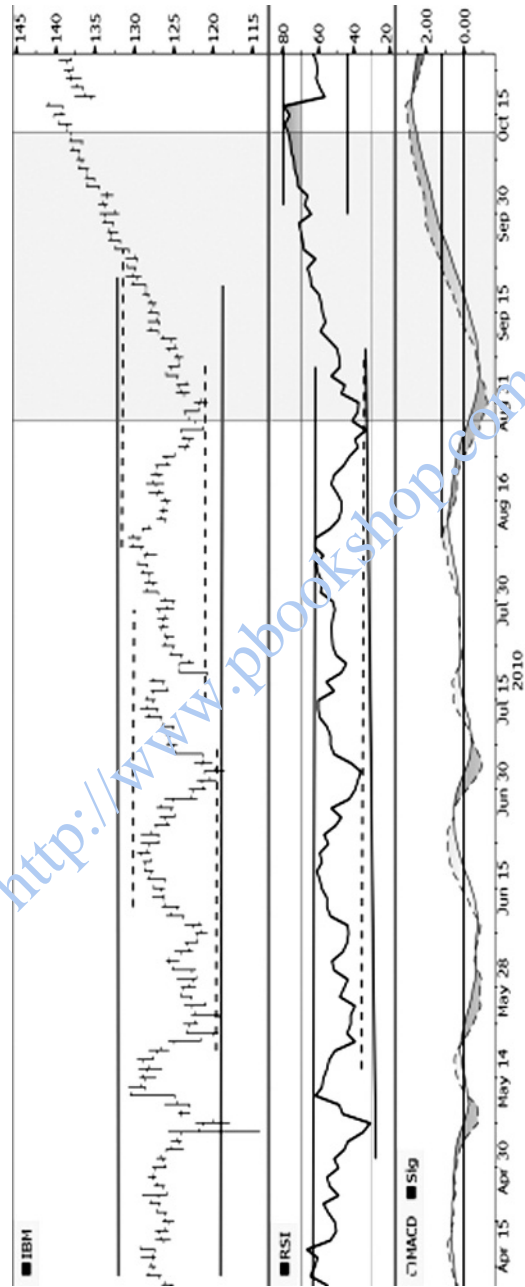
## **Conclusion**

I encourage you to start looking at the indicators presented in this chapter individually and then together. One suggestion for getting started is to apply two studies to a chart and look at different securities and timeframes to become familiar with the movement of the indicators in response to price. The following two figures are examples of combining one trending and one momentum study.

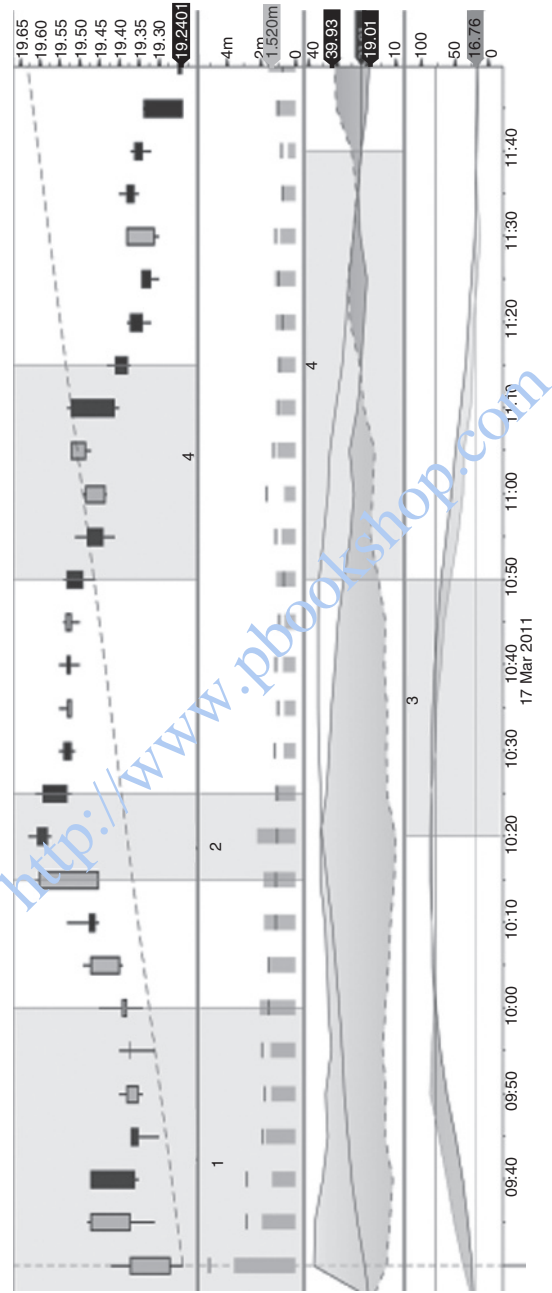
Figure 1.24 shows the range-bound market that the price of IBM was in from April to September 2010. During that time, RSI oscillated between 62 and 33 and MACD frequently whipsawed around the baseline. Realizing this allows us to see a change in trend when price breaks support or resistance while RSI breaks out of the 62–33 zone and the MACD lines make a new high or new low.

In the shaded zone, a new trend emerged. First, we can see from the horizontal dashed lines that price was setting higher lows and higher highs.

**FIGURE 1.24** Determining Trend with RSI and MACD Combined



**FIGURE 1.25** Determining Trend with DMI, STO, and VAT Combined



Then, in the shaded zone, price broke above resistance (prior high), RSI touched 70, and almost immediately the MACD1 and signal lines broke above their prior highs. A new trend was emerging, and in this case it was up, as defined by two indicators instead of one.

Figure 1.25 combines the DMI, STO, and VAT on a five-minute intraday chart. In zone 1, price opened higher and for the first six bars, or 30 minutes of trading, volume was less than the VAT, yet price was moving higher. In zone 2, volume was 90 percent greater than VAT while price made a new high but closed the period down. Greater-than-average volume with no up movement, and in this case some down movement, is a sign of weakness for the existing trend. In zone 3, price was drifting lower and the stochastic crossed down below 80, exiting the overbought zone. In zone 4, price broke below the upward-sloping trend line and the +DMI crossed below the -DMI. All of this suggested that the strength at the open was not going to hold for the rest of the day. From the point of the trend-line break to the end of the day, price declined 1.44 percent.

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