
 **Wiley Trading**  
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# FULL-VIEW INTEGRATED TECHNICAL ANALYSIS

A SYSTEMATIC APPROACH TO ACTIVE STOCK MARKET INVESTING

**XIN XIE**



# Full View Integrated Technical Analysis

A Systematic Approach  
to Active Stock Market  
Investing



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## Preface

As an economist by training, I was instinctively very skeptical of technical analysis. However, the years working at UBS and Bank of America doing macroeconomic analysis of economies across Asia after the 1997 Asian financial market crisis, and through the bursting of the high-tech bubble in 2000, taught me a first-hand lesson: macroeconomic analysis has its limitations, especially when used as the base for investment strategies. Macroeconomic forecasting is a mixture of art and science. To get the forecast right, the forecaster has to be sensitive and insightful about the unique nature of each circumstance. Making investment decisions solely based on macroeconomic analysis involves a high degree of risk both because of the uncertainty in macroeconomic forecasting itself and the unpredictable link between economic fundamentals and market performance. The same things can be said about firm fundamental analysis. Stylized fundamental analyses cannot fully account for the observed complexity of real macroeconomic and firm activities, let alone offer robust forecasts of financial market dynamics.

The International Monetary Fund (IMF), for example, employs teams of economists around the world and uses large structural equation models to analyze the world economy, but its forecasts often look somewhat distant from reality in the eyes of financial market economists who make forecasts with much simpler models but follow the economies closely. This is despite the impressive analyses of various issues faced by the world economy accompanying the forecasts in the annual IMF *World Economic Outlook*. The discrepancy between the impressive analyses of the issues and a weak forecasting performance suggests that the problem is not with the IMF or any other particular organization doing the forecasts, but rather lies with the inadequacy of the stylized fundamental theories in capturing the complexity and ever changing economic conditions with fixed parametric systems specified in the structural forecasting equations.

Furthermore, even when the forecast is done accurately, with a few notable exceptions, it does not translate easily to financial market forecasts or the right investment decisions. Even in retrospect, the observed macroeconomic and firm fundamentals do not account for

all the observed market dynamics. Instead, the market is mostly driven by issues of concern to market participants at the time, which may or may not be directly related to what is happening in the economy. Right timing is often more important than the right forecast; and perceived issues are often more important than the actual issues, in the short run at least. While the real issues will eventually transpire in the long run, it may no longer matter by the time this happens for two reasons:

1. The investor may not have the risk-bearing capacity to wait for the real issue to transpire, not knowing when it will happen.
2. Many new market concerns may emerge to mask the impact of the issue when it occurs.

The significant uncertainty associated with using fundamental analysis as the tool for investment decision-making led me to study technical analysis. Despite initial skepticism, the value of technical analysis quickly became apparent upon closer examination. First, most indicators apparently have some explanatory power on market dynamics. Next, and more importantly, it succeeds where fundamental analysis fails. It helps to understand short-term market movements whereas fundamental analysis is most ineffective in explaining short-run market dynamics; it can be used to forecast future market dynamics whereas fundamental variables often lag behind financial markets. While the deviation of market prices from fundamentals may be used to forecast the eventual reverting back of market prices towards realignment with the fundamentals, the expected realignment has not yielded exploitable opportunities for consistently higher investment returns as a result of the difficulty in timing the price reversal based on fundamental analysis. Lastly, while individual indicators have fairly high rates of failure, different indicators capture different aspects of the market dynamics. Thus, the information offered by different technical indicators, if effectively put together, offers promising prospects for a good understanding of market movements.

On the other hand, it is equally apparent to anyone who is serious about using technical analysis for investment decision making that despite significant amounts of accumulated knowledge, the current approaches are far from being satisfactory. First, it fails too often. The explanatory power of any given individual indicator is too low and resulting uncertainty is too high. Skills accumulated over many years of experience may help to reduce the uncertainty and increase the success rate. But this suggests that a crucial part of the knowledge remains

tacit and cannot be easily passed on to other people. Furthermore, when indicators fail to offer the right signal, there is no good explanation; therefore, one is condemned to repeat the mistake the next time around.

Second, a rich set of indicators and an abundance of different approaches to technical analysis offer different perspectives on market dynamics, thus can potentially be used together to provide significantly better understanding about market movements. However, in reality, not much effort has been directed at exploring the joint explanatory power and the collective wisdom of this diverse set of accumulated knowledge.

Third, given the lack of an integrated approach between different technical analyses, it is not surprising that the complementarities between technical analysis and fundamental research are left completely unexploited. In fact, most times, one is likely to get a derisive response from both technical analysts and fundamental analysts on mentioning any attempt to put fundamental and technical analyses together. Technical analysts in particular often make a conscious effort to avoid being influenced by fundamental analysis or any other market related information. This is completely unjustified given that the path taken in the past is a reflection of what is expected of the future and that there is a difference between the realized and the expected future.

Given the unexploited potential and the unsatisfactory state of the existing approaches to technical analysis, the way forward is clear. In order to reduce the rate of failures, we need to understand the reasons for the forecasting errors generated by the indicators and use the indicators conditionally in the absence of the factors causing the failures, rather than unconditionally. In addition, we need to explore the joint power of different indicators as well as harvest the combined wisdom of technical analysis and fundamental analysis.

As it turns out, the two roads lead to one destination—a broad understanding of market dynamics rather than a narrow focus on isolated individual patterns. For a broad understanding of market dynamics, the following three observations are fundamental:

1. The market is driven by many different trends each with bounded duration.
2. The operation of the trends is not independent of each other.
3. Different trends are best captured by different interval charts or data series of different interval sizes.

Because of the influence from higher order time intervals, the analysis of the patterns will be associated with a high degree of uncertainty if the focus is on a single or a limited few interval charts. The uncertainty will be further increased if the analysis is done by using a single indicator. To obtain robust results, a full-view approach must be adopted to take all trends of different durations into consideration; and an integrated approach must be adopted to incorporate information about different aspects of the market dynamics from multiple indicators.

This book presents such a system, named Full View Integrated Technical Analysis (FVITA). The broad understanding of the market dynamics obtained through FVITA naturally lends itself to being integrated with fundamental analysis, making it possible to further enhance the explanatory power of the analytical system and deepen the understanding about broad market dynamics.

The presentation of FVITA in the book will largely follow the thought process described above. Chapter 1 discusses broad deficiencies of the current approaches to technical analysis and the necessity for a new approach. Chapter 2 examines various indicators being used currently to capture two important aspects of market dynamics—trends and perturbation around the trends. The deficiency of each indicator in the context of the current technical analysis is discussed. Based on the discussion, the best ones from each group of the indicators are selected for FVITA.

Chapter 3 sets up the physical structure of FVITA by constructing a set of interval charts that offers complete coverage of the market dynamics. Chapter 4 introduces the concept of bounded trends associated with the chosen set of intervals. Chapter 5 completes the building blocks of FVITA with a catalogue of various indicators associated with different market pausing points.

Chapter 6 presents the main body of analytical contents of FVITA—the signals for confirming a trend reversal and temporary countertrend movements respectively. Chapter 7 continues the analytical discussion focusing on different market turning points and durations of temporary pauses. Chapter 8 is a collection of five case studies that employ the FVITA system to examine recent episodes of bubbles and crashes in three major markets.

In introducing the indicators and analytical rules in the first seven chapters, I have opted to use actual market data in the illustrative charts for the sake of presenting an actual market environment where the indicators are observed. However, in those cases, the detailed market conditions such as the date, the particular market, and the full

view market environment will not be discussed; the focus is on the main technical properties of the indicator of concern. Furthermore, the charts used are not related to each other unless clearly indicated.

On the other hand, in the case studies presented in chapter 8, the broad market conditions and the specific market being considered become important for the analysis. For effective FVITA analysis, it is very helpful to have the broad market conditions in mind. For this reason, two most recent episodes of bubbles and crashes are selected for the case studies so that the fresh memories of broad market conditions and the macroeconomic context make it easier to follow the discussion.

Chapters 9 to 11 address broader issues with regard to technical analysis. The theoretical foundation of technical analysis is first examined, followed with a discussion of the general direction for the integration of technical analysis with macro and firm fundamental analysis, as well as quantitative finance.

At the very least, by pointing out why and where the existing technical analysis fails, the analytical framework presented here should help readers avoid costly mistakes. With the concept of bounded bull and bear market marking the effective ranges of market forces of different duration, it will help to increase the robustness of the existing indicators by providing the necessary conditions for their correct usage. Most significantly, the FVITA framework offers an effective way to exploit the collective wisdom of the existing technical analysis and provides a systematic, consistent, and open framework to understand the broad market dynamics. It is the author's hope that the analytical structure of the full view integrated approach to technical analysis and the empirically robust main body of results offered here will lay the ground for a more productive conceptual framework for conducting technical analyses and facilitate the integration of technical and fundamental analyses in financial market research.





## The Need for a Full View Integrated Approach

### 1.1 THE MOTIVATION

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#### 1.1.1 The Need for a New Paradigm

Technical analysis provides useful information about market dynamics, but one needs many years of experience and to be one of the best in the industry to do it right and do it with a degree of consistency. While much work has been done in accumulating significant amounts of knowledge in the field, important parts of the knowledge required for effective application of technical analysis are still not formalized and codified. This is reflected in the fact that most people do not get consistent results from technical analysis. For the majority of people who depend on technical analysis for making trading and investment decisions, the experience is often frustrating due to frequent failures and the lack of a meaningful way to conduct postmortem analysis about the reasons for the failures. The reason behind the uncertainty is simple, most technical analyses, consciously or unconsciously, use one fixed-time interval chart as their main focus. Although there are a few commendable efforts in employing multi-time-frame analysis, they are not widely followed, partly because further improvement is needed in exploiting the added power in order to justify the increased complexity.

In reality, the effective range of indicators calculated on one interval chart is very limited. The independently effective range, i.e., the range where movements are not driven by factors associated with other intervals, is even more limited. On average, analyses based on, say, a one-day interval chart are effective probably no more than 20 percent of the time. For the remaining 80 percent, analyses are purely operating

on chance; the direction of the market is not related to the indicator values of the selected interval chart, but rather driven by factors that would be reflected in the values of the indicators from charts of other time intervals.

**Interval charts:** an interval chart is a trace of stock market values made by using each time interval as one observation point, recording on the chart one or more values of open, high, low and close of each observation point. A one-day interval chart takes one or more of the values in a day as one observation point and displays all the observations for a given period on the chart; a one-week interval chart takes those values in a week as one observation point; and a two-week interval chart takes those values observed in two weeks and displays them on the chart.

The interval charts used in this book are candlestick interval charts, which display all the above four values for each observation point. See figure 2.1 for an example. The filled gray bars are falling bars with the close lower than the open. Rising bars with the close higher than the open are shown either as filled black bars (e.g. figure 2.1) or unfilled bars (e.g. figure 4.3).

Behind each interval chart are the series of the recorded values at each observation point. The two-terms interval charts and interval data series will be used interchangeably in the discussion.

While trend lines, channels and other graphic tools can be used to forecast a long-term trend, the weakness of such tools is that they are highly subjective and their effectiveness depends heavily on the user's experience and skills. Furthermore, they are strong in describing what has happened but have limited ability to predict what is going to happen. Trying to forecast the market based on such tools produces highly uncertain results, as the nature of such patterns is highly dependant on conditions in charts of higher order time intervals. At the pausing point of longer interval data series, when the market is on a temporary short-term countermovement in a lower order time interval, it most times would display notable pauses against the short-term trend before final resumption of the long-term trend. On the other hand, before completing the trend or reaching pausing points in longer interval data series, the market may move straightly in one direction after finishing shorter time interval countertrend/waves, or only pausing for a shortened period of time before resuming the movement in the original direction.

Even for experienced users and even after a multi-time framework is adopted, it remains an agonizing experience to decide whether a bear market has ended, or whether a rebound is only temporary. There has not been an indicator or an approach in technical analysis that can

provide answers to the above questions with a good degree of confidence and a sound logic to support it. The best that can be hoped is a statistical analysis that says that the indicator worked, say, 65 percent of the time in the past. Strictly following the indicators from a given interval chart such as the daily interval chart may result in repeated failures. For example, on a long declining trend, taking a long position on short-term pausing-ups, would suffer repeatedly from the ensuing further falls.

Even when an attempt is made to analyze a long-term trend by employing, say, a 40-day, 150-day or 200-day moving average, the result remains highly uncertain. First, using indicators calculated based on one-day charts to capture a long-term trend is at most an approximation. Therefore, there will almost always be a gap between the true value and the approximation. Second, the right choice of the parameters (i.e., is it a 40-day, 150-day or 200-day that should be used?) is closely related to the depth and the duration of the original trend in the opposite direction. Therefore, there is no fixed parameter that is right for all market conditions.

Presently, however, most users make their pick of a fixed parameter for the long-term trend and stick with it, whatever the specific market conditions. And such a pick does not have any analytical foundation. At most, a statistical analysis is made on the average success rate of different parameters in the past; the one that was most successful is then selected. The approach based on such statistical analyses can provide useful information, but has significant flaws when used as the base for taking market positions. There are two fundamental assumptions that serve as the foundation of technical analysis: that the past matters for the future and that historical patterns repeat themselves. Because of the first assumption, today is different from any time in the past as a result of having a different history. Therefore, for the second assumption to be applicable, the right condition must be specified for the repetition of the patterns. But the need for such a specification of the right condition is completely ignored in much of the existing technical analysis, statistical analysis in particular.

A fundamental fact of the stock market, or financial market in general, is that the market is volatile; a given trend is often accompanied by many small countermovements on the way. Many of the temporary countermovements appearing in the daily chart, however, will disappear in the monthly or the quarterly chart. This shows that the volatility associated with longer time intervals is characterized by larger countermovements. This observation, of course, is nothing new. It is commonly accepted that volatility is proportional to the square root of

the interval size. It should be pointed out that the assumptions made to obtain such a conclusion, and the use of unconditional volatility to characterize stock market dynamics are questionable and not supported by the analytical system presented in this book. However, the implication that a longer trend is associated with higher volatility is consistent with empirical observations.

It follows that the reversal of larger trends associated with a longer time interval requires countermovements of longer durations to confirm. This is required to make sure that the countermovements indeed signal the end of the original trend and the start of a new trend in the opposite direction, not just a result of volatility with the original trend still in force.

Consequently, as a necessary condition, the size of the original trend must be the same to justify the use of the same parameter value in determining whether the old trend has been reversed and a new counter-trend has been established. Most technical analyses would have been more effective had attention been paid to this important conditionality. One laudable exception is the adaptive indicator approach, which tries to differentiate volatilities from trend reversals in various well thought out and sophisticated ways. It should be pointed out, however, that the concept of volatility used in the approach is not the right one. Instead of focusing on the potential magnitude of volatilities, attention is paid to the observed volatilities. As a result, the existing approaches to technical analysis cannot correctly identify the end of a trend and the start of a new trend with a high degree of consistency.

There is another area of technical analysis where improvement can be made to take advantage of the accumulated knowledge. Most times, indicators are employed in isolation. Efforts need to be made to systematically exploit the joint power of multiple indicators that reflect different aspects of the market.

### **1.1.2 The Answers from FVITA**

The Full View Integrated Technical Analysis (FVITA) system introduced here takes advantage of the accumulated wisdom of existing technical analysis and addresses the aforementioned weaknesses successfully. The success is achieved by introducing a system of time intervals and focusing the analysis on different time intervals according to different market conditions. The design of the system is based on two fundamental facts about the stock market. First, as already mentioned above, the stock market is volatile. A deeper and longer trend takes a deeper

and longer countermovement to confirm its reversal and differentiate it from movement caused by volatility. Second, the stock market is fractal; the structure of the stock market, and financial market in general, is the same across different time intervals.

There are two different ways to construct our analysis so that it is consistent with the first fact about the stock market: to use a fixed time interval while adapting the parameters of the indicators used in the analysis according to each specific market condition, or to use the same indicator parameters and change the time interval being focused on according to the market conditions to be analyzed. The latter is unquestionably a better choice.

First, changing the parameter value is not desirable given that most of the indicators are not linear in nature in terms of time. Therefore, there is no easy and consistent way to relate the parameter values to different market conditions and get accurate and robust results. Second, given the second fact about the stock market, switching between different intervals can be easily carried out with the same set of analytical tools. To whatever degree of success an indicator's fixed parameter values can be used in one interval chart, it can be used to the other interval charts with the same degree of success. The patterns and rules governing the stock market work in the same way on charts of different interval sizes. Third, by switching time intervals while using the same indicator parameters, all the existing knowledge accumulated on technical analysis can be inherited whenever they are useful; the most effective indicators can be selected for the construction of an optimal analytical system.

Of course, all the limitations of the current technical analysis as it applies to each individual time interval will also be inherited. As it turns out, the most important limitation of the current technical analysis is its aforementioned inability to capture the forces associated with market dynamics of different duration. The key therefore is to find the boundaries of such limitations and construct a system of time intervals such that the end of the effectiveness of one interval chart is the beginning of the effectiveness of another interval chart. Equally important, objective criteria are needed to evaluate when such a boundary has been reached as the focus of the analysis will have to be shifted to a different interval chart accordingly. The good news is that FVITA indeed offers such a system of charts that are analytically manageable and at the same time perform excellently in offering continued effective coverage of market movements. Also developed are objective rules to decide which interval charts should be the focus of the analysis in different market conditions.

As a result, the analysis presented here will not only be more accurate and robust, but it will also be objective, consistent, and systematic, offering standardized and continuous coverage of the stock market movements.

Based on the system constructed here, we are able to answer, in novel ways, the critical questions of whether a bear market, or a declining trend, has ended and how we can judge if a rebound is only temporary.

Finally, note that it is possible for the driving forces associated with charts of different interval sizes to operate at the same time. While the central focus will be on one interval adapted to the specific market conditions, the system presented here allows the flexibility of paying attention to multiple intervals at the same time and taking into account the interactions between them when necessary.

## 1.2 THE NECESSITY OF FVITA

Analyzing a system of interval charts is apparently more complicated than focusing on just one fixed interval chart. But this complication is a reflection of the complexity of the stock market and is therefore necessary.

Take a careful look at the results of using a fixed-time interval for technical analysis, say the one-day interval chart. It may be observed that the trend indicators such as moving average or MACD of the selected time interval are fairly good in providing the right signal for long-term trend reversal when it happens. This observation, however, is misleading. The correct forecasting of a long-term trend by the daily interval chart is due to the fact that the change of a long-term trend always starts from the reversal of a short-term trend. Therefore, when the long-term trend does change, the short-term trend indicator will always provide the right signal.

However, when the long-term trend is still unfinished, and the market moves in the opposite direction on a short-term, temporary counter-movement, i.e., when the short-term and the long-term trend move in the opposite directions, the short-term interval chart will provide faulty signals. If the market rises temporarily with a long-term declining trend still incomplete, the fall will resume after a short period of pausing-up. In this case, the signal of a positive trend provided by the lower order interval chart will very quickly prove to be wrong if used to forecast the reversal of the long-term declining trend.

Suppose a daily chart is used to forecast a longer interval trend, say a trend driven by factors behind a monthly or quarterly interval chart,

and the user wishes to forecast the timing of the bottoming-up in a declining market. The right call will be made for sure when the final bottoming up occurs, because when the longer interval chart finishes its fall, the one-day chart will turn up first and signal the reversal of the negative trend. However, before the bottom is reached, when the longer interval downtrend has not been completed, there may be many temporary pause-ups where the one-day chart would send wrong signals of trend reversals.

In making any forecast, the forecaster needs to control two types of errors. A type I error is the error of making a forecast, but it does not materialize. A type II error is the error of missing to make a call when the event of interest occurs. Normally when different forecasting methods or systems are being evaluated, the main focus is on minimizing a type I error. For making forecasts in the stock market, it is obvious that controlling a type I error is the more important concern. When a type II error is committed, normally it means inaction and missed opportunities for profit. If a type I error is committed, however, it most likely will lead to wrong investment or trading decisions and result in losses. Using charts of short intervals to forecast a long-term trend has a high probability in making a type I error, calling a long-term trend reversal while the trend is still in force.

Is it a good strategy to address the above problem by following the short-interval rebound signal into the market and getting out when the signal turns negative? The answer is negative. Before the completion of a long-term trend, there may be many short-term pausing-ups. Such a strategy will accumulate a large amount of losses along the way before finally getting it right. When the market is close to a large pausing-up point, or close to the completion of the downside, in particular, volatility can be very high; the market may fall in waves rather than by a straight line on short-interval charts, with numerous short-term pausing-ups between falling waves. During these periods, the market may move in exactly the opposite direction to what is signaled by the short-term chart. As the short-term chart signals a positive trend, the stock market starts to fall. Shortly after the short-interval trend indicator turns negative, the market rebounds again. This can happen multiple times.

Furthermore, while short-interval trend signals will turn positive when the bottom of the long-term falling trend is reached, they may turn negative again temporarily and result in an early exit after the bottom-up in the long-term trend, with the possibility of missing out most of the profitable opportunities on the way up as a result of frequent, unnecessary exits.

If a short-interval trend indicator cannot be relied on to signal the reversal of long-term declining trends, can we use the chart of a long enough interval to make sure that most of the downturns are driven by a data series of shorter time intervals than the chosen interval? This will make sure that a trend reversal signal from the selected interval will cover most of the downtrend; the type I error will be drastically reduced. However, the approach is obviously not the right answer. First, if the interval chosen is too long, there may be significant countermovements within a continuing trend being ignored. Significant opportunities will be missed when the market moves in the opposite direction while the big trend is still not completed. For example, suppose a quarterly interval chart is used as the focus of analysis. On the course to complete a trend, there could be several months' countermovements on the way that will be missed, because the trend in the quarterly chart remains in force. This is despite the fact that the quarterly interval is still not large enough for correctly analyzing the decline associated with a cyclical economic downturn, such as the one accompanying the 2007 financial market crisis, or the market downturn after the internet bubble in 2000.

Second, if a position is held in the direction of the original trend, focusing only on the long time interval may lead to large and persistent losses that go beyond the investor's or trader's risk-bearing capacity. This is because signals from the long time interval will fail to detect many countertrend movements that are small relative to the selected time interval, but large relative to the risk preference of the position taker.

Furthermore, it takes more time for longer interval charts to send out signals than shorter interval charts. If a mistake is made, it will take more time to confirm the mistake, resulting in big losses. Taking the quarterly interval chart as an example, it may take several months before we can confirm a mistake is made. This is a risk most people would want to avoid. Additionally, it will also take a longer time to confirm a new trend for getting into the market. Obviously, if a few weeks are enough to confirm an uptrend, there is no reason to wait for a few months or a few quarters before action. In the latter case, the opportunity may no longer be available, or may have lost most of its value.

Finally, while a longer interval will reduce the risk of committing type I errors, it will increase the risk of committing type II errors, leading to missed calls when lower order interval trends are reversed.

Therefore, focusing on a single time interval, whatever its size, leaves us in the dark most times, resulting in missed opportunities as



well as unwanted risks. It is necessary to adopt a full view approach to technical analysis that focuses on whatever interval charts are the most appropriate for the given market conditions. Only when the interval chart is appropriately chosen in a systematic way, will it be possible to tailor the analysis to tightly match the specific market conditions and have a high degree of confidence in the judgment being made, and doing so in the timeliest way.

### **1.3 RANDOM WALK?**

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Any serious attempt at building a technical analysis system with a reasonable analytical foundation will have to confront the efficient market hypothesis, or its statistically testable form—the random walk theory. The latter states that future market prices cannot be forecast based on past and present market prices. Chapter 9 will offer more detailed discussion about the two and the difference between them. Whichever way the hypothesis is stated, the central message is the same for most of its adherents—if there were profitable opportunities presented by forecastable prices, it would have been taken.

While this does raise doubts about old, simple trading rules that are in the public domain, it would be a leap of faith to say that no rules, not even new, sophisticated rules in the private domain can be effective. There is no theoretical foundation for such an argument unless one is willing to assume a strong form of rationality that all market participants know everything possible about market valuation instantaneously. This strong form of rationality is clearly an untenable proposition under any reasonable interpretation of investor behavior associated with past market dynamics, especially during episodes of bubbles and panics. In fact, Eugene Fama, who developed the efficient market hypothesis in 1965, recognized that “There is nothing . . . , however, which suggests that superior fundamental or intrinsic value analysis is useless in a random walk-efficient market.” What is said about fundamental analysis applies equally well to technical analysis.

The strength of the efficient market hypothesis thus rests not on strong logic but rather on the fact that most of the initial statistical analyses showed that the associated random walk theory stood well against alternative specifications. This initial success of the random walk theory, however, was more a reflection of the weakness of the alternative specification, rather than the strength of the random walk theory itself. The failure of the alternative specification is not a proof

of the validity of the random walk theory. In fact, in more recent years, there have been an increasing number of studies coming up with statistical evidence against the random walk theory. However, given how easy it is to run regressions with increasingly powerful computers and the difficulty to realize real trading gains from the demonstrated deviations, it is fair to state that the random walk theory remains hard to beat.

FVITA presented here, however, shows that the difficulty in beating the random walk theory is well anticipated given the alternative model specification used in the existing literature. In fact, the implication of FVITA is that the majority of the tests are misspecified with important missing variables. Based on patterns characterized by FVITA, the market dynamics are far more complicated than any trading rules that have been tested, suggesting a non-linear relationship between future prices and past prices with time varying parameters, likely of different signs under different market conditions of higher order time intervals. With higher order time interval conditions missing from the tests, the statistical analysis based on data collected from a single time interval suffers the same problem pointed out earlier about technical analysis. This explains why the random walk theory has been difficult to beat, and also points to the risk of spurious results in the cases when the alternative specification receives statistical support.

Clearly, the approach taken by FVITA will have to be tested and verified by other users after extensive tests by the author. Nonetheless, it is fair to say at this point that however the existing body of statistical and theoretical evidence is interpreted in relation to the efficient-market random walk theory, it does not provide a valid argument against technical analysis in general, and the system being presented here in particular. On the other hand, the robust regularities described in FVITA and presented here not only offer strong evidence against the random walk theory, but also raise serious questions about the validity of the empirical evidence in its favor.

## Two Basic Elements of Market Dynamics

The factors affecting market movements can be separated into two main categories—volatilities and trends. They are captured by two different groups of indicators; oscillators and trend indicators respectively. This chapter will introduce these two indicator groups with a few frequently used indicators, discuss their use in the existing technical analysis and their information content. The chapter will use the introduced indicators to illustrate where the current approaches fail in providing accurate forecast of market directions. While the analysis focuses on the indicator approach, the problems pointed out here apply to technical charting as well. Finally, the indicators best suited for the analytical system to be introduced here will be picked, and modified when necessary.

### 2.1 OSCILLATORS—AN OVERVIEW

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Because of the volatility, the market tends to fluctuate around a long-term trend, generating small countermovements while moving along the trend. These fluctuations tend to be short-term and their reversals are expected to be signaled by oscillators, if constructed and utilized correctly. There are many different oscillators. The following is a list of the most commonly used in technical analysis.

#### 1. Momentum indicator

The momentum indicator is given by

$$M = C - C_n$$

where  $M$  is the momentum indicator,  $C$  is the closing price of the current period and  $C_n$  is the closing price  $n$  periods ago.

Momentum measures the speed of change for a given time span. If the momentum indicator is less than zero and falling, the market is decreasing, compared with  $n$  periods ago, and decreasing at increasing rates. If the momentum indicator is less than zero and rising, the market is decreasing but decreasing at slowing rates. On the other hand, if the momentum indicator is above zero and rising, the market is rising and rising at accelerating rates; if the momentum indicator is above zero, but falling, the market is rising, but rising at decelerating rates.

When the momentum indicator is rising, but at slowing rates, the rise is forecast to top off. When the momentum indicator falls to below zero and if the overall market is judged to be on a falling trend, a sell signal is considered having emerged. Similarly, when the market is judged to be on a rising trend and the momentum indicator bottoms up from a fall to rise above zero, it is considered a buy signal. The momentum indicator is used to indicate the reversal of short-term movements and the return to the direction of the trend.

## 2. Rate of change (ROC)

The rate of change indicator is given by

$$\text{ROC} = 100 (C / C_n)$$

where  $C$  and  $C_n$  are the same as defined before. When the ROC is above 100, the market is rising compared with  $n$  periods ago. If the ROC is above 100 and rising, then the market is rising and rising at accelerating rates. If the ROC is above 100 and falling, then the market is rising, but rising at decelerating rates. The case for the ROC below 100 can be similarly divided into falling at accelerating rates and falling at decelerating rates.

When the ROC tops off and falls to below 100 with the overall big trend towards the down side, it sends out a sell signal on the return of the market towards the downside after an upward deviation against the falling trend. On the other hand, when the ROC bottoms up and rises to above 100 with the overall big trend being positive, it sends out a buy signal on the return of the market towards the upside after a downward deviation against the original rising trend.

## 3. Difference between moving averages

The difference between moving averages is calculated as follows:

$$\text{DMA} = \text{MA}_n - \text{MA}_N$$

where DMA is the difference between moving averages,  $MA_n$  is the moving average over the past  $n$  periods and  $MA_N$  is the moving average over the past  $N$  periods;  $N > n$ . If  $K$  is used to denote the current period, then

$$MA_n = (CN_{K-n+1} + CN_{K-n+2} + \dots + CN_{K-1} + C_K)/n$$

#### 4. Percentage difference of moving averages

The percentage difference of moving averages is calculated as follows:

$$RMA = 100 \cdot (MA_n / MA_N) - 100$$

where RMA is the ratio of moving averages (percentage difference of moving average is just normalized ratio of moving averages);  $MA_N$  is the same as defined above.

The main idea is the same for the above two oscillators defined over MA. The oscillators crossing the zero line from negative to positive signals that the market is turning up, while the oscillators crossing the zero line from positive to negative signals that the market is turning down. There are often extreme value lines constructed on both sides of the zero line to indicate the normal range of the oscillators; above the upper extreme lines, the oscillators are expected to fall towards the zero line; below the lower extreme lines, the oscillators are expected to rise towards the zero line. The extreme values, however, can differ from market to market and from time to time, making it impossible to have a scale-free decision rule applicable to different markets, at different times or across different interval  $t$  sizes.

Not being independent of the scale of the price data is also the problem faced by the earlier two indicators—ROC and momentum indicator. Fortunately, this undesirable feature does not appear in the following two oscillators to be introduced—the relative strength indicator and stochastics.

A second undesirable feature of the above oscillators and more damaging for the needs of our analysis is that they are not a direct measure of the deviation of the market from a trend, and do not have a monotone relationship with the deviation. Instead, they are based indirectly on the market behavior when it reaches the boundaries of the deviation to signal the tendency of the market towards returning to the trend. What is needed for the analytical system of FVITA, however, is an oscillator that directly measures the deviation from a trend and that displays the highest possible consistency

across different markets and time. Thus the search for the best oscillator moves to the next two indicators.

### 5. Relative strength indicator (RSI)

The relative strength indicator is calculated as follows:

$$RSI = 100 - [100 / (1 + RS)]; \text{ and}$$

RS = average value of change in the rising data points / average value of change in the falling data points.

Where the average is taken over a specified period of observation points, normally chosen to be 3, 9, or 14. RSI normalizes the value of RS and has a range between 0 and 100.

Additionally, two lines are drawn, one on each side of the center line at 50. Normally, the upper line is drawn with a value of 70 to 80, the lower line is symmetrically drawn at 30 or 20. Above the upper line the market is considered being overbought, and is expected to fall. On the other hand, below the lower line, the market is considered oversold and expected to rebound.

RSI is a more direct measure of market deviation from a trend; and it is much closer to a monotone mapping of the price actions. Furthermore, it is more uniformly distributed across different markets and periods of time with the same extreme values and very similar overbought and oversold zones. But stochastics perform even better on all accounts.

### 6. Stochastics

Normally, in using stochastics two lines are calculated; %K line and %D line.

$$\%K = 100(C - L9) / (H9 - L9)$$

where C is the current closing price, and L9 the lowest low price of the last nine observations and H9 is the highest high price of the last nine observations. Most practitioners use five days for the above calculation. However, for the purpose here, nine is the best choice.

The %K line provides the relative position of the current closing price in the range between the lowest low and highest high of the last nine observations. The value of %K ranges from 0 to 100: 0 indicates that the current closing price reaches the lowest low in the last nine observations; 100 indicates that the current closing price reaches the highest high in the last nine observations;

50 means that the current closing price is at the middle between the highest high and lowest low of the last nine observations.

Similar to the case of RSI, an upper line and a lower line are drawn at 80 and 20 on the two sides of the middle line at 50. Above the upper line, the market is considered overbought and expected to fall. Below the lower line, the market is considered oversold and expected to rebound.

When %K is used alone, it is easily dominated by one observation. To avoid the problem, the second line, the %D line, is proposed. The %D line is calculated the same way as the %K line except the denominators and the numerators are all three-day averages instead of the values of single observations.

$$\%D = 100 [3 \text{ day MA of } (C - L9) / 3 \text{ day MA of } (H9 - L9)]$$

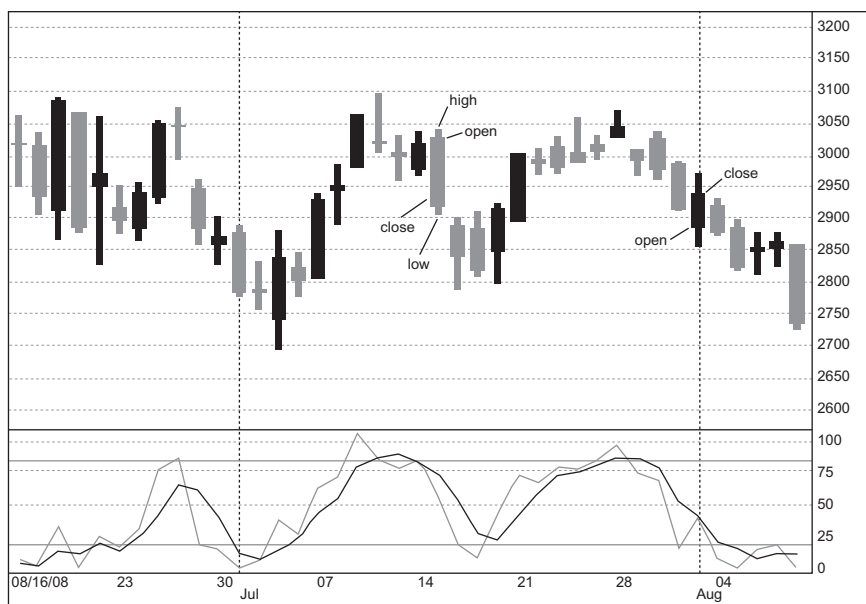
Here the notations are the same as used before.

The %D line is normally used in two ways. First, it is used in the same way as the %K line. But without being overly influenced by a single observation, its performance is more stable than the %K line. Second, the %D line can be used together with the %K line to derive more information from market movements.

Because the %D line is calculated on averages, it lags behind the %K line. When the %K line rises, the %D line goes below the %K line; when the market falls, the %K line falls faster and earlier than the %D line. As a result, when the %K line falls from the overbought zone to below the %D line, it offers another signal for the market to regress from the deviation towards the trend. If this signal is also combined with double tops, it further increases the likelihood of the market moving towards the direction signaled by the indicators. The case for the %K line rises from the oversold zone to above the zone and the %D line is similar; it can be combined with double bottoms to enhance the reliability of the forecast.

Besides using extreme zones as an indication of the market moving too far away from the running trend, the divergence between all the mentioned oscillators and the price action is often employed to signal the expected return of the market towards its central tendency. The divergence of the indicator and the price occurs when a rising price is accompanied by a falling oscillator value in the overbought zone, or a falling price is accompanied by a rising oscillator value in the oversold zone.

Figure 2.1 provides an example of stochastics indicators being shown on a daily chart. The gray line is the %K line and the black



**Figure 2.1** The simple use of stochastics

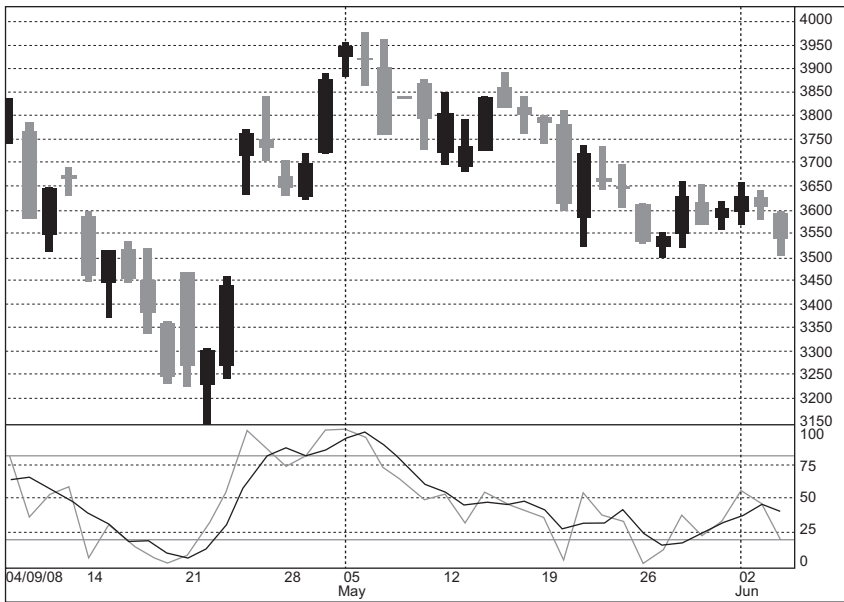
Source: Data and graphic used with permission from eSignal

line is the %D line. The overbought line is set at 80 and the oversold line at 20. The chart is drawn from daily data of the Shanghai Stock Market Composite Index.

Figure 2.2 shows an example of double tops. The chart is drawn from daily data of the Shanghai Stock Market Composite Index.

The biggest problem with all the oscillators, when used alone, is that during the course of a long-term uptrend, they can stay in the overbought zone for a long period of time. Or, when there is a long-term falling trend, the market can stay in the oversold zone persistently without the expected rebound. Therefore, it is often cautioned that oscillators should not be used against a strong trend, especially when the trend is just starting. Instead, oscillators are best used in markets trading in a range without a clear trend. Or they should be used together with the trend signal, i.e., using the overbought signal of the oscillators on a falling trend or when an uptrend is coming to an end; using the oversold signal of the oscillators with a rising trend or when a downtrend is coming to an end.





**Figure 2.2** Double tops

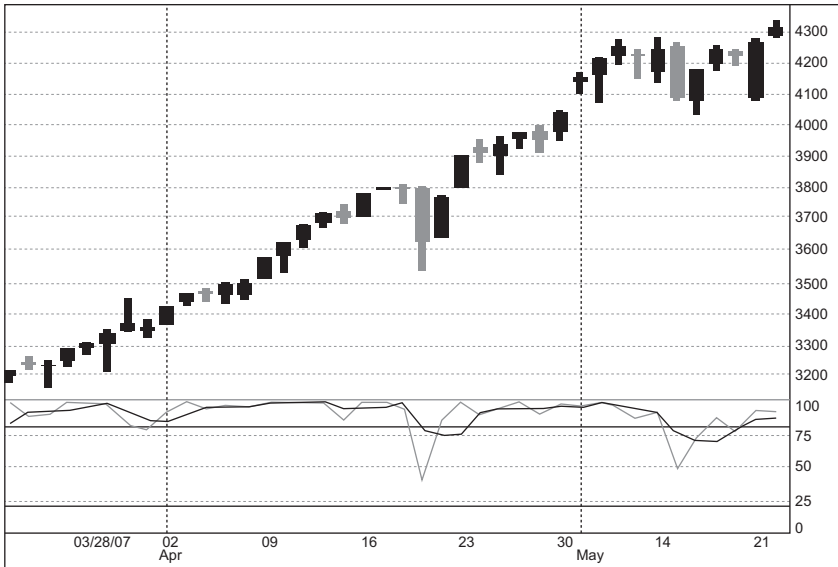
Source: Data and graphic used with permission from eSignal

Figure 2.3 shows that the stochastics fail to provide the expected signal, staying in the overbought zone for a prolonged period and rebounding quickly after falling from double tops. The chart is drawn from daily data of the Shanghai Stock Market Composite Index.

Clearly, the practitioners of technical analysis have been painfully aware of the problems associated with oscillators, stochastics in particular. The proposed solutions are helpful, but leave much to be desired.

The attempt to restrict the use of oscillators to a market with no clear trend runs into its own problem. There is no good way to tell the beginning and the end of such a market. Without a robust means to decide when such a market is in operation, the proposed solution is not operational and if applied will produce random results. Furthermore, such an approach severely limits the usefulness of such a powerful tool that captures one of the most important aspects of market movements.

The strategy of combining the oscillators with trend indicators, while conceptually sound, runs into practical problems as well. First, the trend



**Figure 2.3** The failure of stochastics

Source: Data and graphic used with permission from eSignal

indicators used have as many problems as the oscillators. There is no good way, as it stands now, to accurately and robustly forecast a trend. Second, what is a trend and what is mere perturbation from a trend are not well defined. A trend in the weekly chart, for example, can be the reversal of another weekly trend, or just a perturbation in a monthly data series. Understanding the difference between the two is critically important. If the movement is caused by the oscillation of the monthly data series around an unfinished trend, the establishment of a weekly countertrend will not be enough for sustained movement in the new direction. Therefore, to understand the difference between a new trend and the volatility around the existing trend requires a clear definition and good understanding of trends with different durations. Unfortunately, the latter are not provided by the existing technical analysis. Third, there is no systematic way to forecast the duration of a trend. While waves are often used for trend forecasting, there are no alternative tools to deal with the situation when there are no visible waves. Furthermore, there is no attempt at explaining the failures in completing a wave or the continuation of a wave beyond the expected duration. Finally, after the completion of a trend, there may be a reversal towards the opposite direction or the market may continue in the

original direction to move into a larger trend after a brief pause in the other direction. The existing technical analysis does not have an effective framework to differentiate the two radically different cases.

Despite the problems mentioned associated with the current use of the oscillators, it is important to point out that the concept of the oscillator captures one of the most important features of the stock market. There are frequent deviations from an ongoing trend; and there is also a tendency for the market to regress back towards the central tendency after deviations from the trend. This tendency is captured most successfully, straightforwardly and consistently across different markets, at different times in different time frames by stochastics. For these reasons, stochastics will be the oscillator used in the analytical system, FVITA, presented in this book; the problems faced by its current use will be effectively addressed by the introduction of the concept of interval-specific trends.

## **2.2 THE OSCILLATOR OF CHOICE—STOCHASTICS**

The problems associated with the existing approach on the use of oscillators in general and stochastics in particular is mainly due to the lack of a clear definition of trends and a robust framework to analyze trends. Those problems will be resolved by looking at a set of interval data series with different interval sizes and associating each trend with an interval data series. This will be accompanied by the introduction of the concept of a bounded bear/bull market that clearly spells out the boundaries of a trend. As a result, stochastics will be a much more effective and robust indicator to be used together with trend indicators. Furthermore, the need for a second line is reduced to a minimum. Thus, the focus will be on the %K line only. While the %D line may still be of some help when used in the traditional way for timing, as long as it is used in a way consistent with the analysis under the proposed framework here, the contribution to new information will be marginal.

Additionally, the 20/80 lines that mark the oversold and overbought zones will be removed. The concern here is focused on whether the %K line reaches the upper and lower bound of 100 and 0. For the convenience of discussion, when the %K line reaches 0, that is, when the market closes at the lowest low of the most recent nine observations, the market is said to have reached stochastics-A. On the other hand, if the market rises to close at the highest high of the most recent nine

observations and the %K line reaches 100, the market is said to have reached stochastics-B.

Stochastics-A: %K = 0

Stochastics-B: %K = 100

Stochastics-A and stochastics-B accurately capture the normal space of fluctuation around a properly defined trend. The regularity is observed consistently across different markets and time, across different time frames under consideration, and does so in a simple and straightforward way.

A slightly modified version of stochastics has also proven to be very useful. Ghost stochastics are calculated the same way as the stochastics defined above with two exceptions: the closing price of the current observation in the formula is replaced by the high to calculate whether the upper bound of 100 has been reached, and replaced by the low to calculate whether the lower bound of 0 has been reached. As before, the main concern here is about whether the upper bound or the lower bound is reached. Thus, there are multiple ways the value of ghost stochastics can be defined between the upper and lower bounds. The following is one possibility.

Ghost stochastics = 100 if  $100 [(H - L9)/(H9 - L9)] = 100$

Ghost stochastics = 0 if  $100 [(L - L9)/(H9 - L9)] = 0$

otherwise

Ghost stochastics = %K

The notations are the same as before.

For convenience of reference, we will call the case where ghost stochastics reaches 0 ghost stochastics-A, or simply ghost-A; the case where ghost stochastics reaches 100 will be named ghost stochastics-B, or simply ghost-B. That is, when the current high is the highest high of the last nine observations, ghost-B is reached. When the current low is the lowest low of the last nine observations, ghost-A is reached.

Ghost-A: Ghost stochastics = 0

Ghost-B: Ghost stochastics = 100

The new stochastics indicator is named ghost stochastics based on the visual effect observed in real time on a chart with streaming data. Suppose the normal stochastics indicator is plotted in a chart with streaming data, and the upper bound of 100 is reached in real time, but the last bar does not close at the highest high of the last nine observations, i.e., the market reaches ghost-B, but not stochastics-B. In this

case, what is observed in real time will be the normally defined stochastics indicator first reaching 100, then retreating back down; it may rise and fall again, sometimes for a number of times, before finally closing below 100. This is a slightly weaker condition than if the bar closed firmly at 100 to reach stochastics-B, but ghost-B shares similar properties with stochastics-B. The properties will be discussed later.

If ghost stochastics-B is plotted on the chart, it will stick to the value of 100 at the observation point once reaching the upper bound, visually separating the case after the closing of the bar from a situation where the upper bound of 100 has not been reached on the way up.

The last observation about stochastics is that ghost-A reached together with the completion of a falling wave, the reach of a support level, or a new low being recorded in the next observation, is the same as stochastics-A normally defined. Similarly, ghost-B reached together with the completion of a rising wave, the reach of a resistance level, or a new high being recorded in the next data point, is the same as stochastics-B normally defined. This observation is useful when considering temporary or permanent countermovement against a trend at stochastics-A and stochastics-B. Resistance, support and waves are familiar terms in technical analysis. The precise definitions to be used in this book will be introduced later.

Stochastics are provided by all the charting packages. If the user is allowed to write self-defined indicators, then ghost stochastics are easy to construct. Otherwise, with the standard stochastics close to the upper bound of 100, it is not difficult to check whether ghost-B is reached manually as long as one keeps in mind the significance of the indicator and remembers to check it. Similarly, when stochastics are close to the lower bound of 0, it is easy to check with one's eyes whether ghost-A is reached.

## **2.3 TREND INDICATOR—MOVING AVERAGE**

A moving average (MA) is the mean of the previous  $n$  observation points, sometimes with different weights attached to different data points. The indicator has a long history in technical analysis. Over time, different users have tried different  $n$  values over which to take the moving average, presumably to reflect the typical cyclical duration in different markets. Attempts have also been made to improve the effectiveness of MA by applying different weights to the observations, most

times giving more weights to data points observed in the more recent periods to highlight the stronger influence by the more recent market history. The most used moving averages are the simple moving average, the linearly weighted moving average and the exponentially smoothed moving average.

**The simple moving average:** The moving average calculated at period  $N$  over the most recent  $n$  periods is given as follows:

$$MA - n = (C_{N-n+1} + C_{N-n+2} + \dots + C_{N-1} + C_N)/n$$

where  $C_t$  is the closing price of observation  $t$ .

**The linearly weighted moving average:** The linearly weighted moving average calculated at period  $N$  over the most recent  $n$  periods is given as follows:

$$WMA - n = (C_{N-n+1} + 2C_{N-n+2} + \dots + (n-1)C_{N-1} + nC_N)/(1 + 2 + \dots + n)$$

**The exponentially smoothed moving average:** The exponentially smoothed moving average calculated at period  $N$  over  $n$  periods is

$$EMA_N(n) = \alpha C_N + (1 - \alpha)EMA_{N-1}(n)$$

where  $\alpha = 2/(n + 1)$ .

The most common and basic application of moving averages is to use the crossing of market price over the MA line as a signal for the change of market direction. When the market price rises from below to above the moving average, the market is expected to have changed from a falling trend into a rising trend. A long position is advised. On the other hand, if the price falls through the MA from above, it is interpreted as a signal of the market turning down, thus it is a signal to sell.

The problem often met with such an application of the MA is that the market price may cross the MA line several times in a short period. To avoid this problem, some practitioners add further conditions before actions are taken when the MA line is crossed in the hope that the decision made will be more robust in terms of forecasting a long lasting trend.

1. After the price goes above the MA line, a positive trend is regarded as being confirmed only when the difference between the two reaches beyond a pre-defined percentage point, say 1, 2, or 3 percent.

2. Drawing two lines on the two sides of the MA line (e.g. MA of the high of each observation as the upper line and MA of the low of each observation as the lower line), only after the upper line is crossed from below, is a rising trend considered being established.
3. Using a longer term MA, say MA over 40 days instead of 10 days.

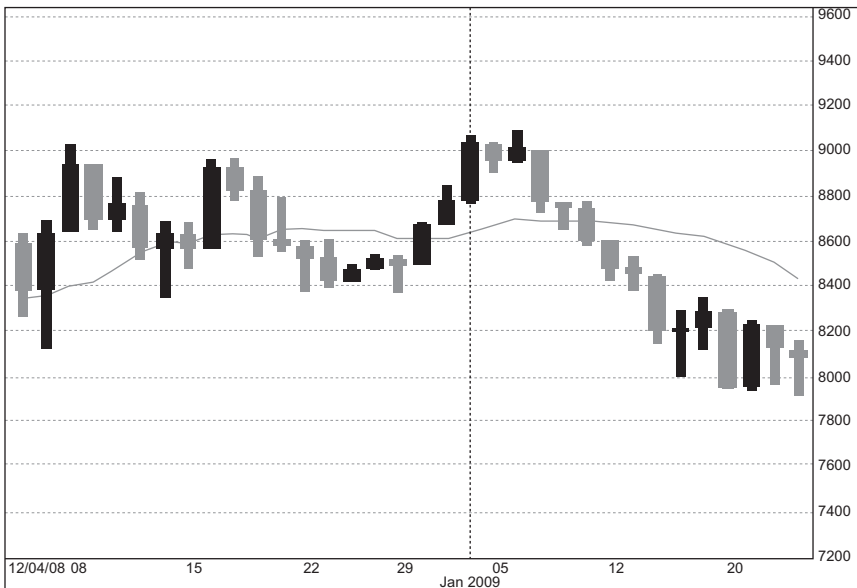
Apparently, many users and researchers have been keenly aware of the significant uncertainties associated with using the MA as a trend indicator and have tried to find ways to correct the problem. Unfortunately, none of the above attempts offer a real solution. They make the crossing of the MA line more difficult, but the increased difficulty does not do much to increase the robustness of the intended results. The proposed measures failed to address the key sources of the problem. First, the MA line over a given period can be used for forecasting trends only for a limited range. Second, depending on the duration of the original trend, the MA employed needs to be adjusted accordingly in order to correctly evaluate whether the trend has been reversed when the MA line is crossed.

In fact, there are attempts at using different parameter values to measure short- and long-term trends separately. But the approach also fails to adequately address the problem. First, there are more than two or three trends that drive market dynamics. But three trends—long-, medium- and short-term trends—are the most popular combination of trends being examined through the employment of different parameter values. Second, it has not been recognized that there should be a link between the original trend and the right MA to be used. Third, adjusting the number of periods over which the MA is taken is not the best solution, as it will provide at best an approximate indication of market direction, often with large margins of error. This is so even when the parameter value is optimally adjusted.

The problem is addressed by FVITA in two ways. First, the interval size of the interval chart from which the data is collected for a MA calculation will be adjusted to reflect market conditions in evaluating whether the direction of the market has changed. As a result of the market price action being fractal, changing the interval size while using the same MA parameter proves to be the best way to measure different trends and trend reversals consistently and accurately. Second, the range of effectiveness of the MA is restricted. The discussion of market trend will be specific to a time interval; the direction of a specific-interval chart will only be effective for a limited range, to be specified later.

As a trend indicator, the simple moving average taken over 14 periods of observation is the best moving average based on extensive empirical tests. A 14-period simple moving average will be the moving average used throughout the book as one trend indicator. The parameter will be fixed while the size of the data interval will be adjusted according to market conditions.

Figure 2.4 is an example of the 14-day moving average, which is drawn as the light line on the chart. The chart is drawn from daily data of the Dow Jones Industrial Average.



**Figure 2.4** 14-day moving average

Source: Data and graphic used with permission from eSignal

## 2.4 TREND INDICATOR—MOVING AVERAGE CONVERGENCE/DIVERGENCE

Moving average convergence/divergence (MACD) is one of the most widely used indicators in technical analysis, for good reason. As far as a trend is concerned, it probably is the most reliable indicator around, as long as the user understands the general principle that any trend indicator, on its own, is only effective within a limited range. Unfortunately, this limitation is often ignored by the existing technical analysis.



MACD analysis is based on three lines; the basic line (or fast line), the signal line and the difference between the first two lines, often drawn in histograms in the chart.

### 1. MACD basic line (or the fast line)

$$\text{MACD fast line} = \text{EMA}(14) - \text{EMA}(26)$$

Where  $\text{EMA}(n)$  is the same as that defined in the previous moving average section.

### 2. MACD signal line (or the slow line)

There are two ways to calculate the value of the MACD signal line; one using a nine-day simple moving average, the other using a nine-day exponentially smoothed moving average.

$$\text{MACD signal line} = \text{MA-9 taken over MACD basic line}$$

$$\text{MACD signal line} = \text{EMA}(9) \text{ taken over MACD basic line}$$

Most users use the signal line calculated on a nine-day exponential moving average. But for the purpose here and based on extensive empirical tests, a nine-day simple moving average has a small edge in terms of accuracy and robustness of the results. MACD calculated on a nine-day simple moving average will be used here.

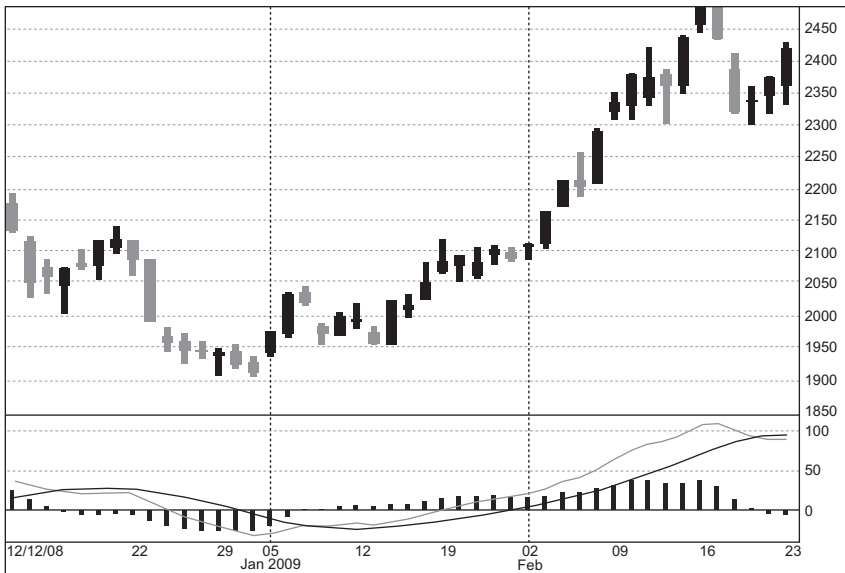
### 3. The difference between MACD fast line and signal line

$$\text{The difference histogram} = \text{MACD fast line} - \text{MACD signal line}$$

As mentioned, the difference is often presented in the charts in a histogram style, so it is often referred to as the MACD histogram.

Figure 2.5 shows the MACD lines. The light line is the MACD signal line. The black line is the MACD basic line. The chart is drawn from daily data of the Shanghai Stock Market Composite Index.

The application of MACD lines is mainly through the analysis of the difference between the signal line and the basic line. When the basic line crosses the signal line from below, that is, the difference histogram crosses the zero line from below, the market is believed to have moved from a declining trend to a rising trend. On the other hand, when the basic line crosses the signal line from above, that is, the difference histogram falls below zero from above, the market is believed to have moved from a rising trend to a falling trend.



**Figure 2.5** MACD lines

Source: Data and graphic used with permission from eSignal

A more cautious way of using MACD is to combine the histogram analysis and the analysis of the level of the MACD basic line and signal line. When the histogram crosses the zero line from below into the positive territory, and when the signal line and the basic line are both positive, the market is regarded as being confirmed to have turned from a negative trend to a positive trend. On the other hand, the signal line and the basic line falling below zero is required, together with the histogram going from positive to negative, to confirm the market turning from a rising trend to a falling trend.

A third way of using MACD is to look for the divergence of the MACD fast line from the price line, simply called an MACD divergence. An MACD divergence occurs when the price line makes a new high without accompanying a new high in the MACD fast line, or when the price line makes a new low without accompanying a new low in the MACD fast line. An MACD divergence with the price line falling is a very good indicator for at least a temporary rebound, after completion of a falling wave or other forms of a falling thrust. A thrust describes the tendency of the market toward moving in certain fixed number of consecutive observation points in one direction;

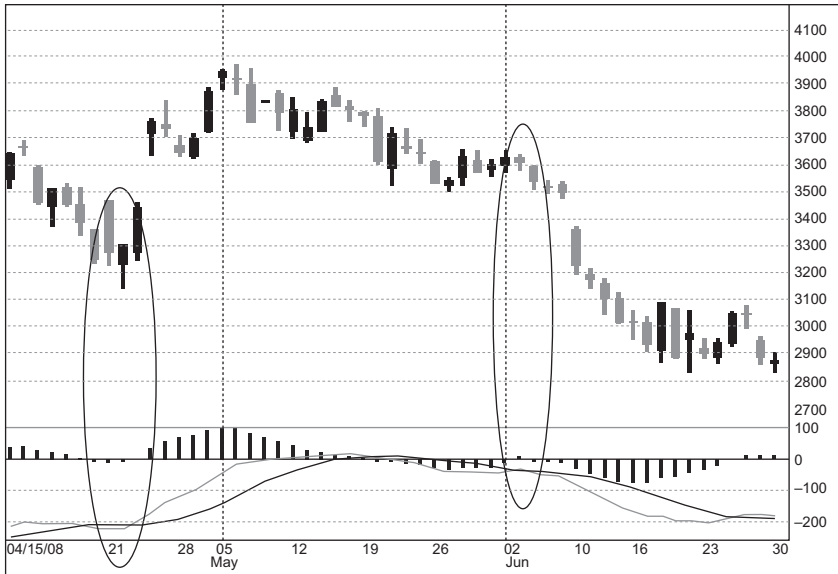
a more detailed definition will be provided later. An MACD divergence with the price line rising is a very good indicator for at least a temporary pullback, after completion of the rising thrust.

While an MACD divergence is a fairly robust signal for a counter-trend movement, the existing approaches to technical analysis fail to make the connection between the divergence signal and the completion of a thrust. Nor do they provide a systematic discussion of different trends so that a temporary countermovement can be distinguished from a permanent one.

It should be mentioned that some people use MACD as an oscillator rather than a trend indicator. Earlier in the discussion of oscillators, the difference between two moving averages was introduced and the undesirable features of it as oscillators pointed out. Using MACD lines as oscillators faces the same problem of those lines not having the same upper bound and lower bound in different markets and over different time periods. Therefore, MACD fits better as a trend indicator rather than as an oscillator. The former is taken here as indicating the establishment of a sustained market movement towards one direction; the latter is more appropriately defined as a measure of the deviation from a trend.

The practice of using MACD both as an oscillator and trend indicator highlights the blurred line between a trend and perturbations around a trend in the existing technical analysis. This confusion is partly due to a lack of clear definition of what is a trend. The term is used mostly as a result of instinctive feeling based on the duration of the market movements with no objective criteria. Another reason for the confusion is the lack of clear understanding of how trends of different durations are related to each other.

Notwithstanding the confusions about whether the MACD indicators should be labeled as an oscillator or a trend indicator, an MACD divergence and an MACD histogram crossing the zero line are two very powerful signals for countertrend movements, temporary or permanent. But both of the signals, by themselves, are effective only within limited ranges. The signals calculated from data over a given time interval must be combined with information of longer term market direction calculated over higher order interval data series. This is required to correctly evaluate how far the market will go on the countermovement against the original trend. By ignoring this necessity, the current use of MACD has resulted in significant uncertainty associated with its forecast and greatly reduced its effectiveness.



**Figure 2.6** MACD lines send the wrong signals  
Source: Data and graphic used with permission from eSignal

Figure 2.6 demonstrates the case of ineffective MACD signals; the market rebounds shortly after the histogram falls into the negative and falls right after the histogram turns positive. The chart is drawn from daily data of the Shanghai Stock Market Composite Index.

Fortunately, there are answers to the problems mentioned above. The problems will be properly addressed once the full set of time intervals used in FVITA is introduced. The meaning of a trend and the limited range of its effectiveness will be clarified and clearly defined with the introduction of the bounded bear market and bull market that is specific to the time interval. Longer term trends will be correctly evaluated by analyzing data series drawn from longer time intervals.

Without referring to a higher order interval data series, one can only make limited statements from analyzing the MACD histogram. The MACD histogram turning from negative to positive can support the market towards the upside at most for eight or so observation points, counting from the lowest point rather than from the point where the histogram turns positive. Similarly, the MACD histogram turning from positive to negative can support the market towards the downside at most for eight or so observation points. However, in the first case with the MACD histogram in the positive, after rising for

four bars, the market will start to be affected by higher order intervals. As a result, it is possible that just after the histogram turns positive, the interval chart has advanced four up-points from the bottom, thus completing the upside range positively indicated by the histogram; the market may turn down for a trend reversal if higher order intervals have negative trends.

In fact, it is not unusual that after the histogram turns from negative to positive, rising four bars, the market turns down and falls to a new low. It can be stated in general that four bars to the upside for a given interval is the highest possible countermovement when the downside of higher interval charts are still incomplete. The four-bar characterization is a rough statement; there are slight variations to the four-bars bound stated, to be detailed later. Similarly, regardless of the value of the MACD lines and the histogram for a given interval, four bars to the downside in the interval is about the lowest possible countermovement when the upside of higher order interval charts is not yet finished.

To summarize, the MACD histogram is a very effective indicator for signaling the turn of market directions, with no need for the basic line and the signal line to cross the zero line as accompanying conditions. However, it must be kept in mind that the effective range of the signal is limited.

Similarly, an MACD divergence is also fairly effective in signaling the change of market directions, but it must be used together with the completion of a trend. Furthermore, the depth of the correction has to be evaluated by examining the higher order interval data series. These considerations will become clear once the structure of FVITA is laid out. But first, it is helpful to discuss briefly some pioneering works that have been done to address the existing problems in two directions. The adaptive indicator approach attempts to adapt the indicators used to specific market conditions; the three-screen system tries to address the problems associated with focusing attention on a single time frame for the analysis of multiple trends.

## **2.5 ADAPTIVE TREND INDICATORS**

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Technical analysis must adapt to specific market conditions in order to be consistent and effective. To do so, measures must be developed to categorize the market into different conditions. One possible choice of such measures for differentiating different market conditions is volatility. Based on the observed variations in volatility, the adaptive

indicator approach postulates that in order to establish a new trend, the countermovement must overcome the volatility displayed along the original trend. Therefore, a market decline associated with a larger volatility on the way down will need a larger countermovement towards the upside to confirm the bottom-up. The larger countermovement is required so that countertrend movements due to volatility will not be mistaken for the start of a new trend.

The clear recognition of the need for different approaches in different market conditions is an important step forward conceptually. It has spurred innovative and sophisticated works by Kaufman (1995), Chande (1994), and Mart (1981) in constructing adaptive trend indicators. All three authors use an exponential moving average as the main starting point, and construct moving average indicators that automatically become slower when volatility increases. A slower moving average, or moving average taken over a longer period will be more difficult to cross on rebound from a declining trend. The difference between their approaches is mainly in how the volatility is measured.

### 2.5.1 Kaufman's Adaptive Moving Average

In Kaufman's Adaptive Moving Average (KAMA), increase in volatility is measure by the decrease in the efficiency ratio (ER), also called fractal efficiency. The ER varies from 0 to 1 and is defined as a ratio, with the numerator being the absolute change of price in the current period from  $n$  periods ago;  $n$  is normally selected as 10, and the denominator being the sum of absolute period to period changes in price in the last  $n$  periods. In a volatile market, period-to-period changes will be large, but they move in different directions. As a result, the change from the starting point in the last  $n$  periods will be small and the ER will be small. On the other hand, if the volatility is low and the market moves in the same direction from period to period,  $ER = 1$ .

$$KAMA_t = KAMA_{t-1} + sc_t (price_t - KAMA_{t-1})$$

where subscripts indicate the period over which the values are calculated or observed.

KAMA is the calculated Kaufman Adaptive Moving Average  
price is market price

sc is the adapting smoothing factor

$$sc_t = [ER_t (\alpha - \alpha_s) + \alpha_s]^2$$

$$\alpha-f = 2/(\text{fastest moving average period} + 1)$$

$$\alpha-s = 2/(\text{slowest moving average period} + 1)$$

$$ER_t = |price_t - price_{t-n}| / \sum_{i \text{ from } t-n \text{ to } t} |price_i - price_{i-1}|$$

The fastest moving average period and slowest moving average period are normally set to 2 and 30, respectively.

### 2.5.2 Chande's Variable Index Dynamic Average

In Chande's Variable Index Dynamic Average (VIDYA), volatility is defined as the ratio between a short-term standard deviation and a long-term standard deviation.

$$VIDYA = k_s C_t + (1 - k_s) CIDA_{t-1}$$

where VIDYA is Chande's Variable Index Dynamic Average,  $s$  is the smoothing factors, corresponding to a 9-day EMA, i.e.,

$$s = 2/(9 + 1) = 0.2$$

$C$  is closing price,  $k$  is relative volatility:

$$k_t = \text{stdev}_t(C, ns) / \text{stdev}_t(C, nl)$$

$\text{stdev}$  is the standard deviation;  $ns < nl$  are the long and short periods over which  $\text{stdev}$  is calculated.

### 2.5.3 Mart's Master Trading Formula

In Mart's Master Trading Formula, the volatility is assessed by averaging two volatility indexes. One index is calculated from the sum of the average true range (the maximum of last observation's close and this observation's high or low) over the last 15 observations. Another index is calculated from the net change in price over the same period.

The adaptive trend indicator approach is clearly thought out and sophisticatedly designed. It effectively addresses one of the problems associated with confirming a trend reversal, for example, the problem created by varying volatilities for the verification of a countertrend. It successfully quantifies the idea that in a more volatile market, a larger movement in the opposite direction is required to confirm a countertrend, temporary or permanent, so that volatility will not be mistaken for a new trend. It should be pointed out, however, that there is a second and more fundamental problem left to be addressed. Distinction should be made on whether the new trend represents a temporary or a permanent change of market direction.

A temporary change of market direction occurs when the original trend is incomplete, but the market pauses towards the opposite direction temporarily before resuming the original trend. For example, such countertrend pauses can often be seen at resistance or support levels before the completion of the original trend. Such a temporary countertrend can be much larger than the volatility displayed on the way to the pausing point, but it is much less persistent than a permanent change of the market direction. A permanent change of the market direction is a reversal of the original trend, the definition of which will be made more precise once the system of FVITA is introduced.

Without differentiating a temporary countertrend from a permanent reversal of the original trend, it is difficult to answer the crucial question of how far the market will travel in the opposite direction after overcoming the volatility. Therefore, further progress needs to be made to decide whether the original trend is still in force, or if it has been terminated by the new trend.

The problem will be effectively addressed by FVITA. By associating a trend with a corresponding time interval, FVITA provides criteria specific to each market condition to judge whether a trend has been terminated by countermovements in the opposite direction. In the meantime, there are also indicators developed to help decide whether a countermovement is only temporary. Furthermore, when a countermovement is only temporary, the boundary of the countertrend will be specified.

Given the sophistication and the conceptual importance of the adaptive indicator approach, it is worthwhile commenting on two additional aspects where improvements may be made. First, it should be noted that observed volatility differs from potential volatility. An empirical regularity is that the volatility of the market can increase sharply on approaching a major pausing point or the point of trend reversal. Such an increase of volatility may come with no prior warning signals in the way of gradual escalation of the perturbation of the market price around the trend. Thus it is important to find ways to avoid mistaking the onset of the high volatility as a new trend.

Second, all the volatilities are calculated using the data from one time frame, normally the daily chart. It is easy to see from the calculation of all the three adaptive trend indicators discussed above that volatility calculated this way differs from what is calculated based on data from longer time intervals. As a result, the calculated volatility will deviate from the true volatility when it is generated by higher order intervals. The higher the time interval behind the volatility, the larger the resulting deviation. And the distortion increases quickly as



the gap between the chosen time interval (i.e., the daily interval) and the market driving time interval enlarges. A more consistent and accurate way of adapting the trend indicator to different volatilities is to use a fixed parameter trend indicator, but adapt the interval size for the data employed in the indicator calculation according to specific market conditions.

Cautionary comments notwithstanding, it is worth stressing that the adaptive indicator approach is sophisticatedly designed with a sound logic behind its construction. With the FVITA system providing a framework for the full view understanding of market dynamics and differentiating a temporary countertrend from a permanent reversal of the trend, the adaptive trend indicators can be integrated into the system to provide effective signals for the start of a new trend, either permanent or temporary.

## **2.6 ADAPTIVE OSCILLATORS**

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Efforts have also been made to produce adaptive oscillators in order to address the problems associated with frequent failures of oscillators. The central issue to be addressed in this case is that the oscillators can stay in the overbought or oversold zone for a long period of time. To resolve the issue, attention has been focused on differentiating various patterns of market actions within the overbought or oversold zone. Unfortunately, this has been done without a clear attempt at shedding light on higher order time frame conditions. As such, the resulting adaptive oscillators do not address the fundamental problem associated with the failure of the traditional oscillators. The fundamental problem is that the oscillators of lower order intervals cannot be used to forecast the duration of market movements driven by forces associated with higher order intervals.

## **2.7 OTHER TOOLS OF TECHNICAL ANALYSIS**

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Besides indicators mentioned in this chapter, there are many other indicators not mentioned. This is due to two reasons. First, the improvements required are the same for the omitted indicators as discussed above in order to increase the robustness of the analysis. Second, they can basically be classified into two categories, oscillators and trend indicators. While a dictionary approach in listing most of the available indicators is useful for many readers, this is not the approach

taken here. There are good books offering that service already. What is attempted here is to point out the common problems associated with each of the two categories of indicators in the existing technical analysis and to find the most effective indicators in each category that are complementary to each other in their information content, to be used in the FVITA system proposed here.

There are also charting tools such as channels, trend lines, bar counts and various patterns used for technical analysis. These tools are not mentioned here because their deficiencies are similar to the indicators discussed. In fact, to most people in the field of technical analysis, indicators are considered more objective and can be more consistently applied than charting instruments. In any event, two observations apply equally to the other tools. First, high-order intervals dominate low-order intervals. Therefore, uncertainty will be high if one focuses only on one time frame or a limited few time frames. Second, the joint power of different indicators must be exploited to offer a systematic understanding of market dynamics and increase the robustness and coverage of technical analysis.

## Multi-Screen Systems

### 3.1 THE NEED FOR MULTI-SCREEN APPROACHES

A fixed interval size with fixed parameter values has its limitations in producing reliable analytical results, as has been pointed out in the previous chapters. Technical analysis must adapt to changing market conditions. However, the adaptation cannot be effectively achieved by changing the parameter values of the indicators. This is because the true dynamics of the market is driven by forces associated with different time intervals. The parameters are not related to the interval sizes in a simple, linear fashion. Therefore, it is impossible to obtain accurate indicator values for different market conditions by adapting the parameter values while using data from a fixed time interval. Furthermore, the magnitude of the approximation error incurred by using the adaptive indicators will vary. First, it depends on the specific market conditions such as volatilities. Second, it increases with the gap between the true interval size driving the market dynamics and the base interval size from which data are obtained for the calculation. Therefore, it is impossible to interpret the approximation in a consistent and systematic way.

Kaufman, a major contributor to the adaptive approach, highlighted the problem in *Trading Systems and Methods*.<sup>1</sup> He noted that, “it is necessary to understand that you cannot substitute a 10-period moving average of 1-hour bars with a 40-period moving average of 15-minute bars.” He further observed that “the use of hourly, daily and weekly time periods—multiple time frames—gives a much different picture of the market than simply using three different moving averages based on the same data.”

It is clear that trends of different durations cannot be captured by one single time frame, adaptive indicators or not. Analyzing the market with a focus on a single interval chart is, to use the Indian parable, like the way blind men feel an elephant; the information obtained will be partial and incapable of telling the whole story. Even when parameters are adjusted in an attempt to adapt indicators to reflect trends of different durations, it is akin to playing ping-pong with boxer's gloves on and unlikely to produce accurate results. To conclude, the adaptation of the analysis under different market conditions is best achieved by changing the interval size of the interval chart being used, rather than the parameter value of the trend indicators.

Looking at charts with different interval sizes is not a new idea. People have long realized that there is more than one trend in the market and attention needs to be paid to intervals of different sizes. In fact, that market has three trends, as Dow, the godfather of technical analysis, stated famously. According to Dow, the primary trend, or tide, runs for several years; the secondary trend, or wave, runs for several months; and the minor or near-term trend, also called ripples, lasts for less than three weeks.

However, most times, the exercise of looking at charts with different interval sizes has not been done in a systematic way. Normally, it is done only when a clear wave or channel of a higher order time interval can be seen easily with the naked eye. Furthermore, there is no clear understanding of where the effect of one chart ends and where the effect of the other chart starts and in what way. As a result, not much can be done with a fair degree of confidence other than taking precautions. Consequently, the available action plan is more an acknowledgement of the existence of a problem than the solution to the problem.

In fact, even the understanding about the existence of the problem is incomplete as the influence of higher order time intervals are constant, affecting market movements all the time, with or without clear and visible patterns of waves and channels.

Given the understanding from the very early stage of the discipline that the market is driven by more than one trend, the overwhelming focus of technical analysis on creating systems and indicators based on fixed parameters in a single fixed time frame may appear somewhat surprising. This seemingly surprising negligence could be caused by two factors: first, a lack of understanding of the significance of what was stated by Kaufman; second, a lack of breakthrough in discovering the rules governing the interactions between different time frames.

In this context, the few attempts at an integrated multi-time frame approach are another laudable effort at moving technical analysis forward, besides the adaptive indicator approach. Among them, Elder (1993), Copsey (1999) and Krausz (2006) are noteworthy for their fruitful efforts in trying to exploit the complementarities between the analyses of different time frames.

## 3.2 TRIPLE SCREENS

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The best articulated departure from the single-minded focus on one time frame for technical analysis is Elder's Triple Screen Trading System framework. The approach is based on three charts of different interval sizes, or three screens. After deciding on a trading time frame, and using it as the middle screen, or wave screen, the user is advised to set up a screen with a shorter time interval, or ripple screen and a screen with a longer time interval, or tide screen. The wave screen is related to the ripple screen by a factor of five in terms of interval size. The tide screen in turn is related to the wave screen by a factor of five in terms of interval size.

The triple screen system uses the tide screen to identify a major trend by employing trend indicators, then looks for countertrend movements in the wave screen. The system then employs oscillators in the wave screen to identify the end of the countertrend and uses the opportunity to take positions in the direction of the established major trend. The third, the ripple screen, is used to set the precise timing of the entry point.

Built on the three trends described by the Dow Theory, Elder's triple screen system expanded the application of the observation. The wave screen, specified by Dow as the monthly interval, can be any interval size chosen by the user in Elder's triple screen system. Furthermore, Elder combined the observation with the discovery of the factor five rule that relates two adjacent cycles to each other. He further designed a brilliant, integrated use of oscillators and trend indicators generated in different time frames.

While the triple screen approach is a significant improvement over the analysis that focuses on a single time frame, three important issues still need to be addressed. First, the triple screen system relies on the usual trend indicators to signal the direction of the tide screen. As a result, the problem faced by single screen analysis still plagues the triple screen system; i.e., after the trend turns, there is no way to tell how far it will go without further analysis of higher order interval charts

beyond the tide screen. More specifically, the lower order trend can be truncated at turning points of higher order intervals. On the other hand, the lower order trend may be extended after confirmation of a larger trend associated with a higher order interval.

Second, the state of high-order intervals not only influences the length of a trend, but also has implications for the pattern along the trend. By focusing on three screens of fixed intervals, this approach misses out on one of most important regularities of the market: that the market behaves very differently when a countermovement is only a temporary pause as compared with a trend reversal. Therefore, when the trend indicator in the tide screen is observed, the rules governing the patterns of market movements in the three-screen setup may be systematically different under the two different circumstances: a temporary countertrend movement vs. a permanent change in the trend. As a result, when the market dynamics are governed by factors associated with higher order intervals than the tide screen interval, systematic errors may result in evaluating not only the distance of the new trend, but also the specific dynamics within whatever distance is to be traveled.

Third, Elder's three screens are arranged according to an insightful discovery that the adjacent cycles are related to each other by a factor of five in terms of interval size. This discovery is also supported by the author's research. However, it should be pointed out that the statement is correct on the cycles, but not adequate on the market. The three screens only offer a partial coverage of market dynamics. The market may be populated by other cycles related to each other by a factor of five as well. Apparently, the aim of the triple-screen approach is to capitalize on an observed regularity of the market, rather than offer a broad understanding of the market dynamics. For a broad understanding of market dynamics and an unabridged coverage of market forces, a second series of interval charts similarly arranged will be required.

Krausz independently created a thoughtful and well-constructed three-screen system. While Krausz has adopted completely different entry strategies, the action plan similarly faces the three issues not addressed by Elder's system. Copsey represents another well thought-out effort in trying to integrate complementary information in doing technical analysis. However, the three issues mentioned above also apply.

FVITA presented in this book is constructed with an explicit intention to address the three issues. The starting point of FVITA is a set of optimally arranged interval charts that nest the three-screen structure

as part of the chart system. By employing a complete set of interval charts and better exploiting the complementarities between different indicators, FVITA provides a framework for a broader and more refined understanding of market dynamics.

### **3.3 EXTENDED INTERVAL CHARTS IN FVITA— DAILY AND UP**

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To recap, the market is driven by forces of different durations associated with intervals of different sizes. A larger trend takes a larger countermovement to ascertain its reversal; the direction of large trends associated with long time intervals have important implications on the dynamics of lower trends associated with smaller time intervals. The fundamental flaw of the traditional technical analysis is its heavy reliance on indicators with constant parameter values calculated from a single interval chart for all possible market conditions.

Recognizing the problem, the adaptive indicator approach and the three-screen approach have tried from different directions to offer solutions. The adaptive indicator approach, while ambitious in its attempt to offer a complete and continuous coverage of market dynamics, is handicapped from the beginning by the fact recognized by one of its leading advocates, that “you cannot substitute a 10-period moving average of 1-hour bars with a 40-period moving average of 15-minute bars.” Sophistication notwithstanding, it cannot be expected to go very far in offering a complete solution.

The three-screen approach, on the other hand, avoids the pitfalls of using unreliable, approximating indicators based on a single time interval to capture the dynamics of different trends, but it is constrained by its localized focus on only three intervals that match the trading preference of the user. Given the clear understanding of the existence of longer and shorter trends outside the range covered by the three screens, the localized focus is likely a result of a mistaken belief that the dynamics of different intervals are more or less independent of each other. While being the most successful and systematic effort in capitalizing on the understanding of the market being driven by cycles of different sizes, the three-screen approach stops short of taking a broader view of the market dynamics, possibly as a result of such a mistaken belief. Consequently, users of the three-screen system have to live with the large uncertainties caused by forces not covered by the system. The incomplete account of market moving forces of different durations is the key to understanding the three important issues left unresolved

by the three-screen approach, namely, the way to confirm a trend, an unabridged coverage of main market dynamics, and the difference between patterns of a temporary pause and that of a trend reversal.

For this reason, the launching pad for constructing a FVITA system is to broaden the coverage of market dynamics from three screens to as many screens as required by the rich market dynamics, but not more than what are needed. To achieve this end, it is important to understand where the influence of one interval ends and where that of the next interval starts. With the boundaries of the effective range of each interval clearly understood, it will not be difficult to select intervals that offer unabridged coverage of market dynamics with the minimum number of intervals.

The set of such optimally chosen intervals will be presented shortly, along with the rationale behind the selection based on the understanding of the effective range of each interval. But since we will depart from Dow's famous three-cycle theory, it is necessary to first go a step back and think about the foundation of our multi-interval approach instead of relying on the Dow Theory. In fact, being an empirical observation, the Dow Theory also needs a few words of elaboration on its justification. There are indeed good justifications for a multi-interval analytical approach.

The stock market is moved by factors of different durations both because of heterogeneous investors driving the demand and supply interactions as well as fundamental economic forces of various durations. The participants of the market are from groups with different investment horizons. Some investors look at their investment return and plan their investment strategies in terms of days, while other more patient investors and investors with stronger means and willingness to bear larger risks would consider their investment decisions in terms of weeks, months or years. Therefore, with regard to demand and supply interactions, there are long-term forces as well as short-term forces behind market movements, leading to trends with different durations.

Furthermore, among the fundamental economic and political factors moving the market, some have a longer-term effect while others are fully reflected in the market in a much faster fashion. Some economic and political events themselves take time to develop; others may be just so complex that their implications can only be digested by the market over time. For example, the weakening of the economy most times develops over the course of several months or several quarters before becoming clear, while the negative impact on the economy due to a particular event, say bad weather or the temporary disruption of



a major production facility, may just affect the market for a few days. Economic cycles may last for several years. Climate and weather cycles may last for several years to decades. The impact of major political events may develop and transpire over anywhere from several days to several years or several decades. Similarly, the effect of important economic agreements or treaties may take several months, several years, or decades to work through the economy and be reflected in the market. Clearly, fundamental factors drive the market with trends of different durations.

To provide a complete coverage of all market trends and their interaction, and to offer standardized treatment of all market conditions, a system of time interval charts is introduced here. This FVITA chart system, from the daily chart-up, consists of:

- One-day interval chart
- Two-day interval chart
- One-week interval chart
- Two-week interval chart
- One-month interval chart
- One-quarter interval chart
- Half-year interval chart
- One-year interval chart
- Two-year interval chart
- Four-year interval chart

The next section will discuss how to extend the interval charts to intra-day market movements. On the other side of the time scale, if data allows, the system can be expanded to include 10-year intervals or even longer.

While investor investment horizons may be associated with a continuum of interval sizes, and political and economic forces may also take effect over the intervals not covered by the above discrete chart system, there are good reasons that the system of judicially spaced interval charts offer a good framework for analyzing broad market dynamics; based on this framework, market movements can be accurately analyzed with little lapse caused by the discrete nature of the charts in the system.

First, all the investors realize that the stock market is affected by aggregate demand and supply, not just their own individual investment behavior. Thus, it is in an individual's interest to balance between his own time preference and market opportunities. This balance is best

achieved by taking advantage of the market cycle that closely matches his time preference and in the process move towards the behavior of the investor group with the time preference closest to the investor's own. Over time, such behavior is likely to result in investors forming groups with discretely distributed time preferences; the market dynamics of such discrete time preferences can be captured by discretely distributed interval charts. Second, uncertainties and imperfect information being strong characteristics of the stock market, individual interpretation of fundamental information is likely to be affected by other investors, resulting in congregated behavior. Third, while there is no strong reason to argue that political and economic forces also have the tendency of taking effect over discrete time intervals, the impact of political and economic forces on the stock market takes shape through the interpretation and the action of market participants. To effectively process the vast amount of information related to the stock market, market participants are likely to categorize the information into a more manageable discrete system of intervals, rather than to deal with the information in its original form with countless different interval formats. There are plenty of examples of human society taking a simplified approach towards processing complex information in such a way: the terrorist threat warning system employed in the US; the typhoon warning system used in mainland China and Hong Kong; and the health risk warning system used by the WHO.

Therefore, being discrete is not a problem that should cause concern. Rather, the worry should be whether the discrete interval chart systems are correctly distributed along the time scale, both in terms of the position of the chosen intervals on the scale as well as the spacing between two neighboring intervals.

There are good reasons to believe that both are done optimally in setting up the FVITA chart system. Careful readers may have noticed the two distinctive features of the FVITA chart system. First, it covers all the normal calendar time units: day, week, month, quarter and year. These calendar units are the natural congregation points on the interval time scale when investors decide on their action plans. In fact, the calendar time units are used by most analysts, traders and investors for fundamental as well as technical analysis. They are also units associated with most fundamental firm and macroeconomic data releases. The use of those units should cause little controversy and help make sure that our interval sizes are properly located on the time scale, leaving only the question of whether the density is the right choice.

The second visible feature of the chart system is the regularity displayed in the spacing between two neighboring charts. From one interval chart to the next chart in the system, the interval size increases by 1-2 times. Suppose  $t$  is used to indicate the order of one interval chart and  $t+1$  to indicate the order of the next chart with a longer interval size. Then the size of interval  $t+1$  is 2-3 times the size of interval  $t$ .

The 2-3 times increment towards the next interval size may look like having something to do with the harmonic principle used in cyclical analysis, which says that the sizes of two adjacent cycles are related to each other by a factor of two. And maybe it does have something to do with the harmonic principle. But if so, it is not by design. The basic consideration in constructing the chart system is to use the least number of charts to provide a complete coverage of the main trending factors behind market movements. The proposed system satisfies this requirement.

More specifically, it has been observed as an empirical regularity that each interval chart is effective for up to four observation points in one direction, independent of higher order intervals; the overall effective range of a time interval does not go beyond eight observation points. It is also observed that each time interval starts to display its binding impact on the market when the market moves against the trend of the interval towards the opposite direction by two observation points. Within the first two bars, the direction is decided by lower ranked interval charts.

Thus, four observation points, i.e., halfway towards the upper bound of the effective range of the interval  $t$  chart, the interval reaches the boundary of its independently effective range. At the same time, interval  $t+1$  records two observation points and starts to exert its influence over the market. The end of the independently effective range of one chart (interval  $t$ ) is the start of the effective range of the next chart (interval  $t+1$ ) in the constructed chart system. This way the system offers continued coverage of forces moving the market with the minimum possible number of interval charts.

Now look at the picture from the perspective of three neighboring time intervals. After eight bars towards one direction, the interval  $t$  chart reaches the end of its effective range; the interval  $t+1$  chart registers four observation points and reaches the end of its independently effective range; the interval  $t+2$  chart starts to take effect. If the interval  $t+2$  chart has an incomplete trend in the opposite direction of the temporary market movements, a reversal of the market towards the direction of interval  $t+2$  will occur. This will be discussed in more

detail later. Here, it is worth noting that interval  $t$  and interval  $t+2$  are related roughly by a factor of 4-6. So if interval  $t+2$  is the tide screen, interval  $t$  can be considered the wave screen. After the tide screen rises by two bars, the wave screen rises by eight bars and should have reached stochastics B. Therefore, the expected reversal explains the rationale behind Elder's Triple Screen Trading System.

However, when more information about the approach of FVITA is laid out, it will become clear that the triple screen system misses out important information about the market dynamics. First, interval  $t$  may reach the bounds of stochastics before the market moves by eight observation points in the interval when the force of interval  $t+2$  is guaranteed to be felt. Therefore, stochastics reaching the bound in interval  $t$  may not offer a robust signal for the reversal of the market towards the trend of interval  $t+2$ . The three-screen system cannot differentiate the two different possibilities. FVITA will offer a solution. Second, the market is also affected by another series of intervals relating two neighboring intervals by a factor of roughly five, the series consisted of intervals  $t-1$ ,  $t+1$ ,  $t+3$ ,  $t+5$ . Whether the market will turn back to complete the trend of interval  $t+2$  depends in part on the direction of interval  $t+3$ . The three-screen system does not capture the influence of this independent force.

Now, it is time to discuss the relationships between intervals of different sizes in the system. Strictly speaking, the precise configuration of the overlapping effective ranges described earlier between intervals  $t$ ,  $t+1$  and  $t+2$  only holds when the size of one interval is exactly two times the size of the next interval  $t$ . However, there are deviations in the selection of the interval charts in the system from the two-time rule. This does produce some exceptions at the margin and should be kept in mind. But this is not a big problem in general; the negative impact on the overall effectiveness of the FVITA system is limited and can be mitigated by taking all the information into consideration and focusing on the high-order interval conditions, once the user is skilled in utilizing the analytical system constructed here. While this still leaves some uncertainties from time to time in the analysis, it is a far more robust system than what is available now.

The likely reason for the robustness of the FVITA analysis, despite the deviation from the two-time rule, is that the calendar units of time are strong choices for the congregation of market behavior. Once those intervals are chosen, the balance between the desire for simplicity and the desire for joining a group not too far away from one's own exact time preference is likely to have dictated that only one more investor

group be formed, with the associated interval size in the middle of any two adjacent calendar units. For the same reason, no additional interval is added between the monthly interval and the quarterly interval as the two are related only by a factor of three.

As pointed out earlier, one of two fundamental facts motivating the FVITA approach is that the market is fractal; the patterns of market movements and the governing rules in different time frames or on charts of different interval sizes are the same. Having constructed a system with the minimum number of charts to offer unabridged coverage of market movements, the focus now is on integrating all the analytical knowledge to provide a good understanding of market movements within the effective range of a representative interval chart. Among the important issues are: the signals that can be used to determine the trend of the interval; the interactions between different time intervals; and the most frequent market turning points of a given interval. Once this understanding is achieved, the analysis can be easily used to generate consistent coverage of market movements in all market conditions providing that the right chart is picked for the analysis.

### **3.4 INTRA-DAY INTERVAL CHARTS IN FVITA**

Before leaving the topic of interval charts, a brief discussion of intra-day analysis is in order. The layout of the intra-day intervals is determined in a similar way as the daily and up charts: picking the conventional interval units as the starting point and adding an interval in the middle of two neighboring conventional time units when necessary. The resulting optimally selected charts of the FVITA intra-day chart system are as follows:

- 1-minute chart
- 2-minute chart
- 4-minute chart
- 10-minute chart
- 25-minute chart
- 60-minute chart
- 2-hour chart

The interval size of the 2h chart will vary in different markets: between 2–3 hours that bridges the 60-minute interval and the daily interval. For the US stock market, the interval size for the 2h chart is

130 minutes, which is between 2–3 times of 60 minutes and results in three complete 2h bars in a day. For convenience of reference, it is uniformly called the 2h chart regardless of the exact length of the interval.

For Japan's market, the choice for the 2h chart is made to separate the day into the morning and afternoon bars, with the morning bar having a 2-hour interval size and the afternoon bar having a 2.5-hour interval size. The chart can be produced easily with an interval size of 3–4 hours properly specified so that the morning bar would cover the whole morning trading session and end before the start of the afternoon session; the afternoon bar would cover the whole afternoon session.

For China's Shanghai Stock Exchange, the approach is similar to what is done with Japan's market: with the 2h-interval size properly specified to offer separate coverage of the morning and afternoon sessions in two bars, each session with a span of two trading hours.

Other markets can be treated similarly with a 2h interval specified to generate complete 2h bars during a day and to have an interval size between 2–3 times of the hourly interval.

There are two noticeable differences between the interval charts proposed here and the interval charts used conventionally by most people in intra-day trading. The 4-minute chart is used here in place of the 5-minute chart commonly used for intra-day trading. The 25-minute chart is used here in place of the 30-minute chart commonly used. Our research shows that the advantage of the intervals proposed here over the commonly used intervals are clear and notable, at least for the purpose of carrying out the analyses under the FVITA system.

For day trading, the yearly interval chart, half-yearly interval chart and quarterly interval chart are rarely needed. Even when they do matter, they matter in a broad sense most times; e.g., with those high-order intervals in positive trends, the falls are more likely to be accompanied with pause-ups, especially at or just before reaching pausing points in monthly, bi-weekly, weekly, two-day and daily intervals. On the other hand, with one or more of those high-order intervals in incomplete downtrends, rises are more likely to be accompanied by pause-downs, and short-term uptrends may terminate prematurely.

Most times, it is the daily, two-day, and weekly time intervals that have a direct impact on the intra-day trading patterns, with their resistance and support levels more closely observed and the approaching of their turning points associated with increased volatility. For example, at a point where the weekly interval chart is expected to have a downward pause, intra-day movements tend to be jittery after more than half a week in the last weekly bar, displaying more pauses while rising

and pausing-downs become increasingly deeper. The impact will be more visible and certain to occur if the weekly chart has reached some type of a resistance/support level, or is very close to such a resistance/support level. The day chart and the two-day chart must be watched closely. Their impact on the intra-day market tends to come at fairly exact points when support/resistance levels are reached, or when a running thrust is completed.

## NOTE

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1. Perry J. Kaufman, *Trading Systems and Methods*, John Wiley & Sons, New York, 1998, p. 470.





## **Bounded, Interval-Specific Bull and Bear Markets**

The departing point of FVITA from the existing approach is the understanding that the market has many trends, and that each trend operates only in a limited range. The Full View chart system of well-selected time intervals introduced in the last chapter is designed to capture fully those different trends. With the system of selected time intervals in place as the foundation of FVITA, this chapter will now define the precise meaning of a trend. The size of a trend, or the exact effective range of a trend, will be made clear by relating it to a specific time interval. An augmented list of criteria, besides the normally used MA and MACD indicators, will be introduced to confirm market trends. The chapter follows with a discussion of the boundary of countermovements along a running trend—the bear-cap and the bull-floor. As a by-product, the analysis presented in this chapter will help to better understand the Triple Screen Trading System. The last section of the chapter looks more carefully into the working of Elder’s Triple Screen Trading System; it will also point out the circumstances when the triple-screen approach is expected to miss the target.

### **4.1 INTERVAL-SPECIFIC BULL AND BEAR MARKET I—CONCEPT**

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Having set up a system of well-selected interval charts to capture trends of different sizes, this section proceeds to define a trend and its effective range by associating it with a specific interval. The term “bull market” will be used to describe an interval on a positive trend; the term “bear market” will be used to describe an interval on a

negative trend; the term “balanced market” will be applied to an interval outside of its effective range, and no longer a force behind market movements.

**The bull market:** If the forces associated with a time interval chart are in their effective range and move the market up, this time interval (chart) is said to be in the bull market, or being bullish.

**The bear market:** If the forces associated with a time interval (chart) are in their effective range and drive the market down, this time interval (chart) is said to be in the bear market, or being bearish.

As pointed out earlier, one observed empirical regularity is that on a positive trend, an interval stays bullish up to eight observation points to the upside; on a negative trend, an interval stays bearish up to eight observation points to the downside.

After eight bars to the upside, this interval is no longer a force that moves the market upward, although it may still affect the market by way of generating a brief pause downward after eight upward bars or slightly more, after nine running bars up, or R9 bars up.<sup>1</sup>

**R9 up-bars:** nine consecutive bars, each closing above the close of four bars ago.

**R9 down-bars:** nine consecutive bars, each closing below the close of four bars ago.

The difference between the case of eight bars and that of R9 bars will be discussed in detail later. The interval will become a force again after turning bearish if the market declines. Similarly, after falling for eight observation points, an interval is no longer a force moving the market downward, although it may move the market in the opposite direction by way of an upward pause before further declines under the force of higher order intervals. Alternatively, the interval may become a force again after turning bullish when the market bottoms up.

To characterize the condition of an interval no longer being a force behind market dynamics after moving by eight or more observation points in one direction, the concept of balanced market is defined next.

**The balanced market:** A time interval (chart) is said to be in the balanced market when it no longer affects the direction of the market. After moving in any one direction for more than eight bars, a time interval is in the balanced market.

Closely related to moving upward for eight bars are moving up by virtual eight bars and quasi-eight bars.

**Virtual eight bars up:** If time interval  $t$  rises less than eight observation points, but time interval  $t+1$  rises from stochastics-A or ghost-A to stochastics-B or ghost-B, then time interval  $t$  is said to have moved up by virtual eight observation points.

**Quasi-eight bars up:** If time interval  $t$  rises by seven observation points, but reaches a resistance level, then the interval is said to have risen by quasi-eight observation points.

Similarly, definitions are provided for virtual eight observation points down and quasi-eight observation points down.

**Virtual eight bars down:** If time interval  $t$  falls less than eight bars, but time interval  $t+1$  falls from stochastics-B or ghost-B to stochastics-A or ghost-A, then time interval  $t$  is said to have moved down by virtual eight bars.

**Quasi-eight bars down:** If time interval  $t$  falls by seven bars, but reaches a support level, then the interval is said to have fallen by quasi-eight.

In defining the above concept, the terms resistance and support are used. The following is the exact meaning of resistance and support being employed in this book.

**Resistance and support:** A resistance or support level is where a local high was reached earlier, after the time interval chart under consideration rose at least for two observation points before turning down and falling by at least two bars; it may also be a local low, which was reached after the time interval chart fell for at least two observation points down before rebounding for at least two observation points up.

According to the definition, clearly, resistance and support levels for time intervals of higher order than  $t$  are also resistance and support levels for interval  $t$ .

With the definition of moving up eight bars being expanded to quasi-eight bars up and virtual eight bars up, and the definition of moving down eight bars being expanded to quasi-eight points down and virtual eight points down, additional conditions can be introduced for the definition of a balanced market.

**The balanced market:** When a time interval in the bear market or balanced market rebounds from the low to rise by virtual eight bars or quasi-eight bars, the interval reaches the balanced market. When a time interval in the bull market or balanced market falls from the high and declines by virtual eight bars or quasi-eight bars, the interval reaches the balanced market.

With the introduction of the balanced market, a boundary is clearly defined for the effective range of the bull and bear market. This concept of bounded bull market and bounded bear market provides us with a good way to capture the different market trends and associate these trends with specific intervals. This second feature proves very useful in focusing our attention to analyzing the right interval charts.

Next, a number of conditions are introduced to evaluate whether a time interval is in the bull market when the market is on the rise. Similarly, another group of conditions are introduced to evaluate whether a time interval chart is in the bear market when the market is on decline.

## 4.2 INTERVAL-SPECIFIC BULL AND BEAR MARKET II—CRITERIA

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Two indicators have already been mentioned that can be used to signal a change of trend: the MACD histogram and the MA. Traditional use of the two indicators has been accompanied by great uncertainties because the indicators are not properly matched with the size of the trend to be measured. In fact, most times the trend itself is not well defined. The bounded bear market and bounded bull market concept associated with specific time intervals introduced here resolves the problem by clearly defining and differentiating trends of different sizes. This makes it possible to match the MACD histogram and the MA correctly to the trend being measured and greatly increases the robustness of the forecasts made by the indicators.

As it turns out, the MACD indicators with traditional parameter values used in the calculation correctly signals the trend change of the interval from which the data are generated. The MACD histogram turning from negative to positive serves as the first condition introduced here for confirming a bull market. Similarly, the MACD histogram turning from positive to negative signals the switch from the bull market to the bear market for the time interval. The MA indicator is the second indicator for signaling a trend. After extensive testing, MA-14 (14-day moving average) proves to be the best MA indicator to be used. Additionally, there are four other conditions that confirm the establishment of a trend associated with a time interval.

**Bull market conditions:** Suppose on the interval  $t$  chart, after falling for eight bars, virtual eight bars or quasi-eight bars into the balanced market, the market rebounds but has not yet risen by eight bars, virtual eight bars or quasi-eight bars to reach the balanced market in the interval. If one of the following six conditions is satisfied, then interval  $t$  is confirmed to be in the bull market.

1. The MACD histogram rises from negative to positive.
2. The price line rises from below the MA-14 line to above the MA-14 line.

3. The price line rises for four bars and the fourth bar closes up from the opening value and above the high of the previous three bars.
4. After rising for eight bars, quasi-eight bars or virtual eight bars in interval  $t-2$ , the market falls by two or more bars in interval  $t-2$  without reaching last low, then rebounds to above last high reached before the fall.
5. After falling from stochastics-B to stochastics-A and by at least eight bars or virtual eight bars in interval  $t$ , the market rebounds, closing above the half-way line between stochastics-B to stochastics-A of interval  $t$ .
6. The market rises from the low in the interval  $t+1$  chart to close above the high of the last two bars before the low was reached.

Similarly, the following conditions confirm interval  $t$  chart entering the bear market.

**Bear market conditions:** Suppose, on the interval  $t$  chart, after rising for eight bars, virtual eight bars or quasi-eight bars into the balanced market, the price line declines but has not yet fallen by eight bars, virtual eight bars or quasi-eight bars to reach the balanced market. If one of the following six conditions is satisfied, then interval  $t$  is in the bear market.

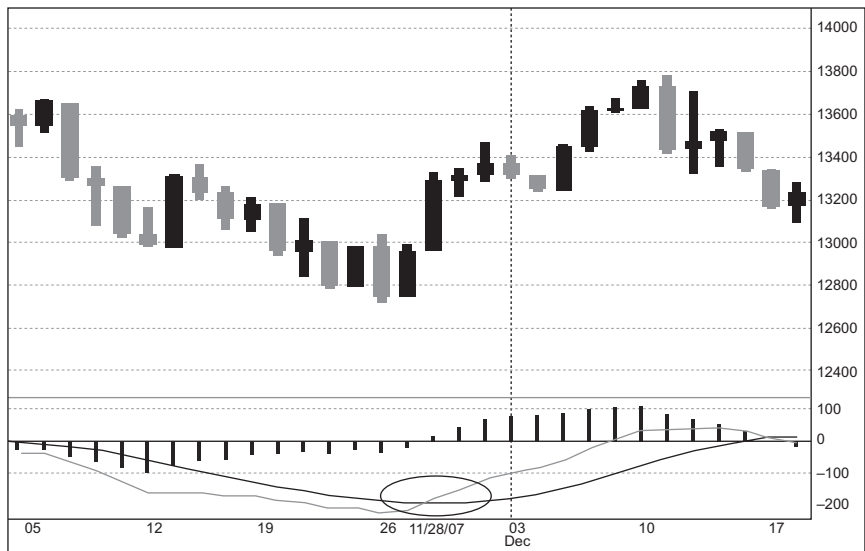
1. The MACD histogram falls from positive to negative.
2. The price line falls from above the MA-14 line to below the MA-14 line.
3. The price line falls for four bars and the 4th bar closes down from the starting value and below the low of the previous three bars.
4. After falling for eight bars, quasi-eight bars or virtual eight bars in interval  $t-2$ , the market rises by two or more bars in interval  $t-2$  without reaching last high, and then falls to below last low reached before the rise.
5. After rising from stochastics-A to stochastics-B and rising by at least eight bars or virtual eight bars in interval  $t$ , the market declines, falling to close below the halfway line between the stochastics-A and the stochastics-B.
6. The market falls from the high in the interval  $t+1$  chart to close below the low of the last two bars before the high was reached.

It should be noted that there is a difference between the interval  $t$  chart being in the bull market and interval  $t$  chart being signaled as in

the bull market. Interval *t* being in the bull market means that the forces behind the interval *t* chart drive the market upward, while the interval *t* chart is signaled to be in the bull market when these upward forces can be detected and confirmed by the above evaluation signals. Most times, signals confirming a trend will be observed with a lag after the start of the trend, with two possible exceptions. First, the MACD histogram of the interval *t* chart or that of higher interval charts may turn positive (negative) before the market starts to rebound (decline). Second, there may be ways to judge, to be introduced later, whether time interval *t* is expected to turn bullish at the turning point or before the turning point is reached. In either case, a countermovement towards the upside is anticipated; the positive trend of interval *t* can be ascertained right from the starting point of the trend.

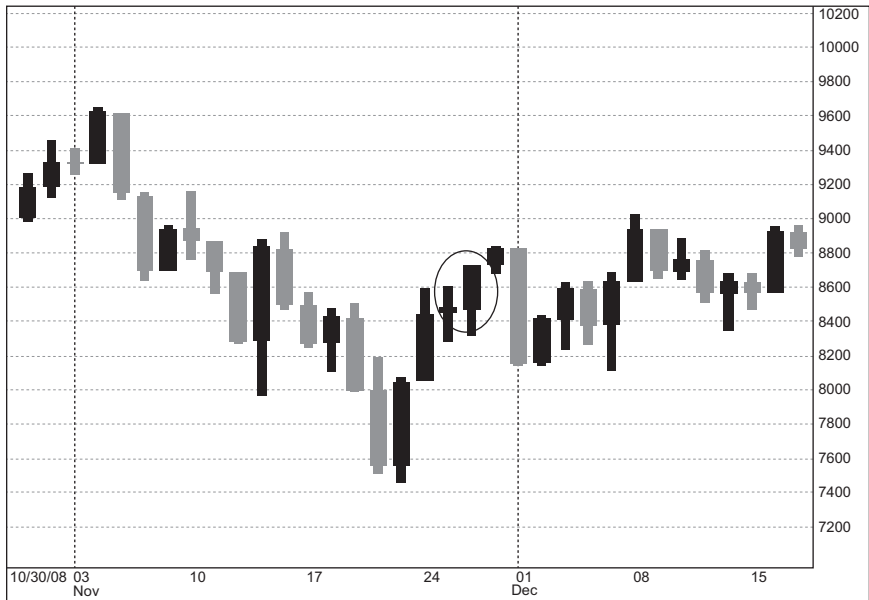
Another point worth noting is that when interval *t* turns from the bear market or the balanced market to the bull market, all lower ordered time intervals switch from balanced market to bull market as well, before reaching eight up points for each time interval respectively.

Figure 4.1 shows the MACD histogram turning positive as the signal for the bull market. The chart is drawn from daily data of the Dow Jones Industrial Average.



**Figure 4.1** MACD histogram turning positive  
Source: Data and graphic used with permission from eSignal

Figure 4.2 illustrates the condition of four rising bars as the signal for the bull market. The chart is drawn from daily data of the Dow Jones Industrial Average.



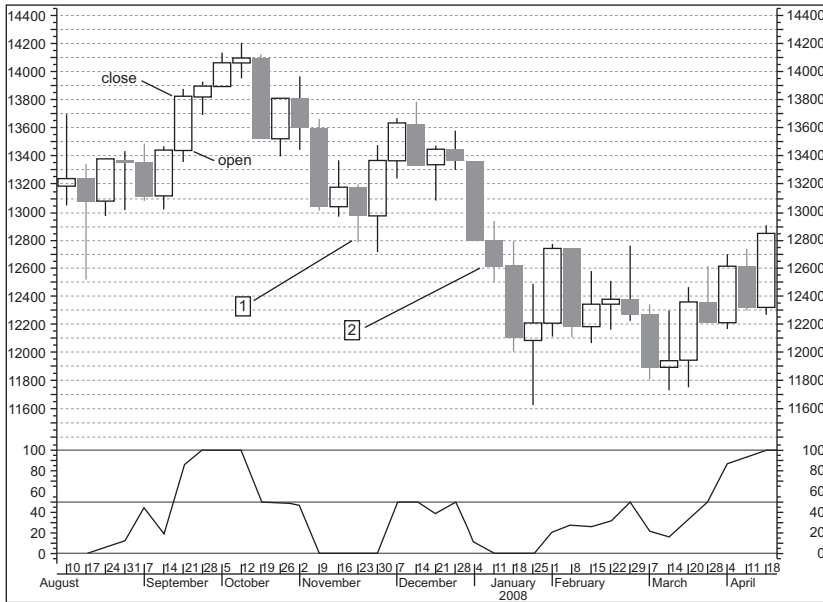
**Figure 4.2** Rising for four bars as bull market signal  
Source: Data and graphic used with permission from eSignal

Figures 4.3, 4.4 and 4.5 illustrate the condition of interval  $t-2$  falling by virtual eight bars, rebounding and falling to a new low as the signal for interval  $t$  entering into the bear market. Here the weekly interval is set to be interval  $t-2$ ; the two-week interval is interval  $t-1$ ; the monthly interval is interval  $t$ . The charts are drawn from data of the Dow Jones Industrial Average.

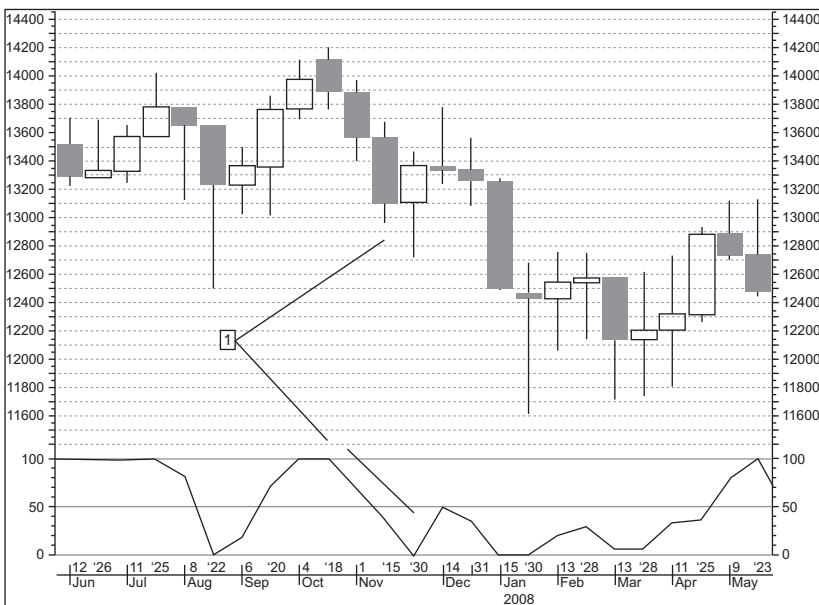
Figure 4.3 displays the weekly interval chart. The interval reaches virtual eight bars down at point 1, as shown in figure 4.4, the two-week chart. After rebounding for more than two bars in the weekly interval, the market falls to a new low after point 2, sending the monthly interval into the bear market.

Figure 4.4 displays the two-week interval chart, which reaches stochastics-B, as virtual eight bars down for the weekly interval at point 1.

Figure 4.5 displays the monthly interval chart, which is shown to have entered into the bear market at point 2, according to the signals

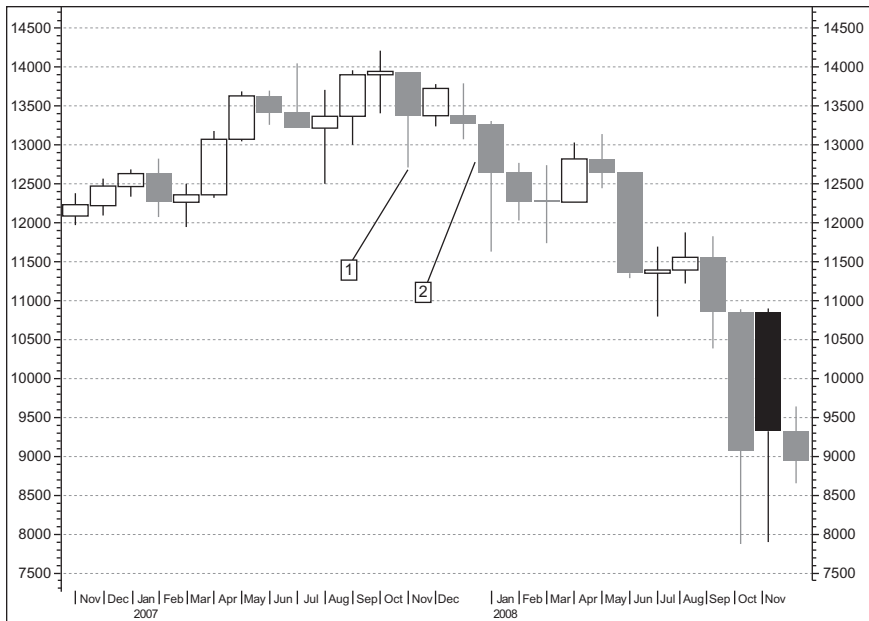


**Figure 4.3** Weekly interval signals the bear market of the monthly interval  
 Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 4.4** Two-week interval reaching stochastics-B  
 Source: Data used with permission from eSignal. Graphic used with permission from MetaStock





**Figure 4.5** Monthly interval falls to the bear market

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

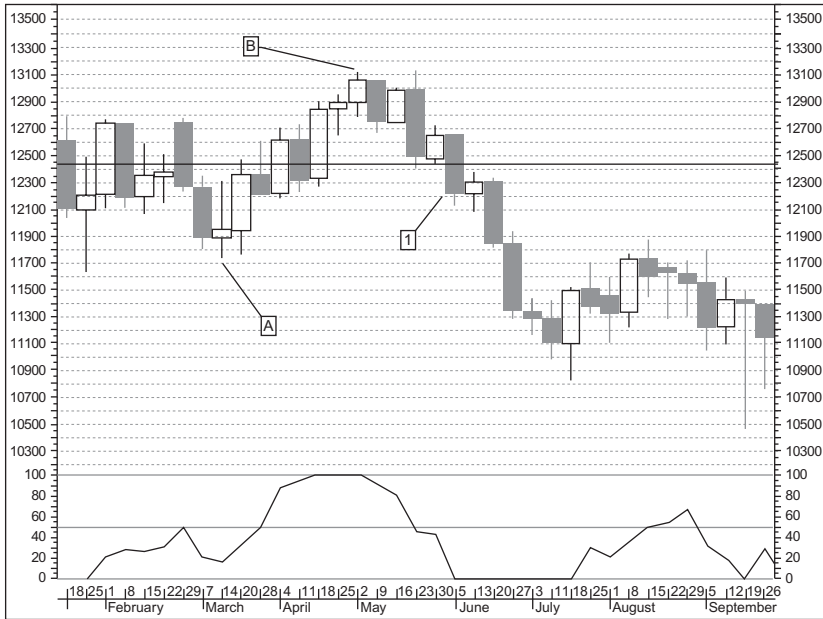
from the weekly and the two-week intervals. While the four-bar rule can also be applied to confirm the monthly interval going to the bear market, the signal from the weekly interval can be confirmed earlier.

Figure 4.6 illustrates the case of falling below the middle line of eight rising bars as the signal for entering the bear market. The chart is drawn from weekly data of the Dow Jones Industrial Average in 2008. The market falls below the middle point between point A and point B at point 1. The horizontal line just below 12500 marks the middle point.

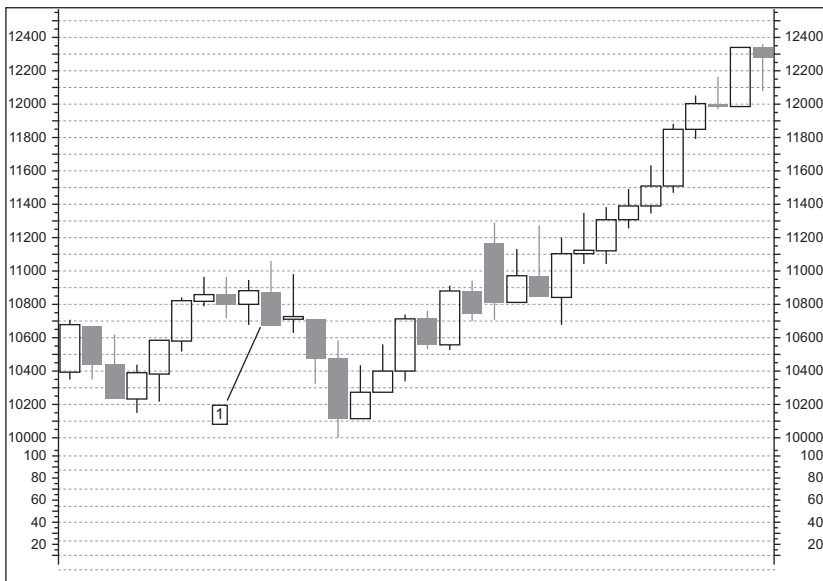
Figure 4.7 shows the case of falling below two rising bars in interval  $t$  chart as a signal for interval  $t-1$  reaching the bear market.

### 4.3 INTERVAL-SPECIFIC BULL AND BEAR MARKET III—LIMITS OF COUNTERMOVEMENTS

One of the important features of the stock market is its volatility. Before interval  $t$  completes its trend of eight bars and reaches the balanced market, the market may move towards the opposite direction. The change of direction may be caused by a permanent change



**Figure 4.6** Falling below the middle line of eight rising bars  
*Source:* Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 4.7** Falling below two rising bars  
*Source:* Data used with permission from eSignal. Graphic used with permission from MetaStock

of trend, or by temporary pauses in the other direction. The temporary pauses against a trend are often referred to as volatility in broad terms. There are two cases to be considered in an observed falling market. First, if interval  $t-1$  is in the bull market, what is the minimum distance a rebound will last before the market turns down again? Second, regardless the direction in interval  $t-1$ , if interval  $t$  is on an unfinished downtrend, what is the upper limit of a temporary rebound? The answer to the first question is that the market will rise to the balanced market in interval  $t-2$  before possibly turning down when the influence of interval  $t$  comes into play. The focus in the following discussion is to answer the second question, the maximum size of the possible “volatilities” or temporary countermovements on the way to the completion of the trend.

A positive statement can be made that an unfinished trend will indeed impose a limit on the size of the countermovements. With interval  $t$  in the bear market on an incomplete declining trend, the maximum upside in a temporary rebound will not go beyond the balanced market in interval  $t-2$ . Similarly, with interval  $t$  in the bull market on an incomplete rising trend, the maximum downside in a temporary fall will not go beyond the balanced market in interval  $t-2$ . The following rules detail the exact conditions under which the reversal to the original trend is expected.

**Bear market cap rule I:** Suppose interval  $t$  is in the bear market and the overall market decline has not been completed. On any temporary pause-up, the market is expected to top off under one of the following six conditions:

1. Interval  $t-2$  rises for eight bars, quasi-eight bars or virtual eight bars, reaching stochastics-B or ghost-B; the MACD histogram of the interval is negative.
2. Interval  $t-2$  rises for eight bars, quasi-eight bars or virtual eight bars, reaching stochastics-B or ghost-B; the price line of the interval remains below the MA-14 line.
3. Interval  $t-1$  rises by four bars, reaching stochastics-B or ghost-B; the MACD histogram of the interval is negative.
4. Interval  $t-1$  rises by four bars, reaching stochastics-B or ghost-B; the price line of the interval remains below the MA-14 line.
5. Interval  $t-2$  rises for eight bars or more, quasi-eight bars or virtual eight bars, reaching stochastics-B or ghost-B. Three rising waves are completed in either the interval  $t-2$  chart, or the interval  $t-3$  chart.
6. Interval  $t-2$  rises by R9 bars.

Interval  $t$  waves are movements in one direction separated by two bars in the opposite direction. More discussions about waves will be provided later. After the introduction of the above bear market cap rule, a note of qualification is in order. The phrase “rising for eight bars” or “reaching balanced market” was used earlier to refer to the end of the effective bullish range in an interval. If this interval is called interval  $t-2$ , then the end of the effective bullish range of interval  $t-2$  is also the starting point when interval  $t$  is expected to exert its influence. But according to the bear market cap rule, for the bearish trend of interval  $t$  to take effect after the interval  $t-2$  chart rises for eight bars to stochastics-B or ghost-B, one other condition is required in the interval  $t-2$  chart: the MACD histogram being negative, the price line falls below the MA-14 line or the price line rises in three waves. A small variation of the topping-off condition is when the interval  $t-1$  chart reaches stochastics-B or ghost-B with the MACD histogram still in the negative or the price line still below the MA-14 line.

Otherwise, there will be two or three more up-bars in the interval  $t-2$  chart to reach R9 up-bars before the market turns down on the unfinished negative trend in the interval  $t$  chart.

Additionally, there are a few terms that have been used without a clear definition on the belief that they are unlikely to generate any confusion in the preceding discussions. However, they are essential for the rest of the discussion. To avoid any possibility of ambiguity, a short clarification of their meaning when referred to in this book is provided:

**Pausing-up:** With the overall decline not yet finished, the market rises for a temporary rebound that is not expected to make a new high or turn the bear market interval into the bull market.

**Pausing-down:** With the overall rise not yet finished, the market falls for a temporary decline that is not expected to make a new low or turn the bull market interval into the bear market.

The maximum upside of a pause-up is limited by the bear market cap. Similarly, the maximum downside of a pause-down is limited by the bull market floor. The termination of a temporary uptrend is called topping off.

**Topping-off:** With the overall downside not yet completed, the market falls to resume the downward trend after pausing-up.

If viewed with the small rising trend as the reference, the topping-off is the end of the small uptrend, or the trend reversal towards the downside. It is worth noting, therefore, for broad stock market indexes, falling from a historical high will never be topping-off. This is because for the broad market, falling from a historical high is always an act

of pausing-down, i.e., temporary in nature with upside trend intact. This will be a very useful observation for later. The observation applies to most individual stocks as well, as long as the companies are not expected to go bankrupt. But some companies do go bankrupt; so the rule does not always apply to individual stocks. Additionally, it may not apply to the currency market.

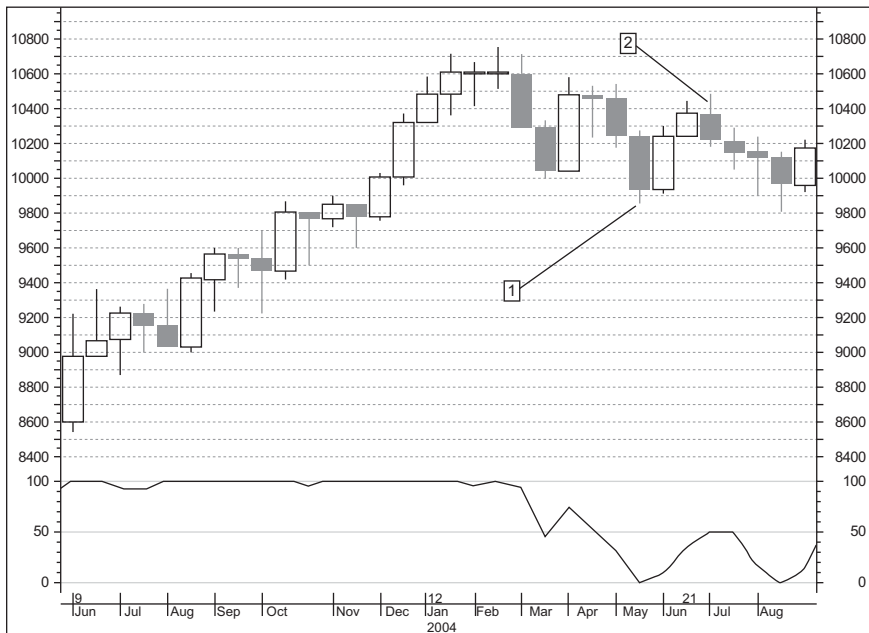
**Bottoming-up:** With the upside not completed yet, the market resumes the positive trend after pausing-down.

For easy reference in the ensuing discussions, two more terms are defined below.

**Trend reversal:** When the market bottoms up or tops off, it is a trend reversal, indicating a permanent change of the running trend.

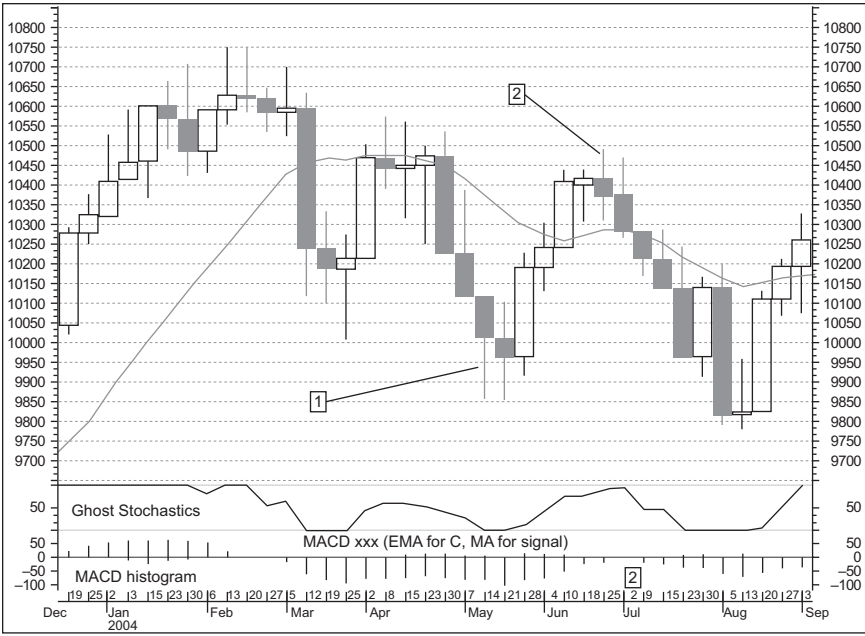
**Market turning point:** The point where the market is expected to make a movement in the opposite direction against the current trend, either due to a temporary pause or a permanent trend reversal.

Figures 4.8 and 4.9 illustrate the working of condition 3 of the bear market cap rule. The charts are drawn with data from the Dow Jones



**Figure 4.8** Two-week interval bear market pause-up

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 4.9** One-week interval ghost-B fall

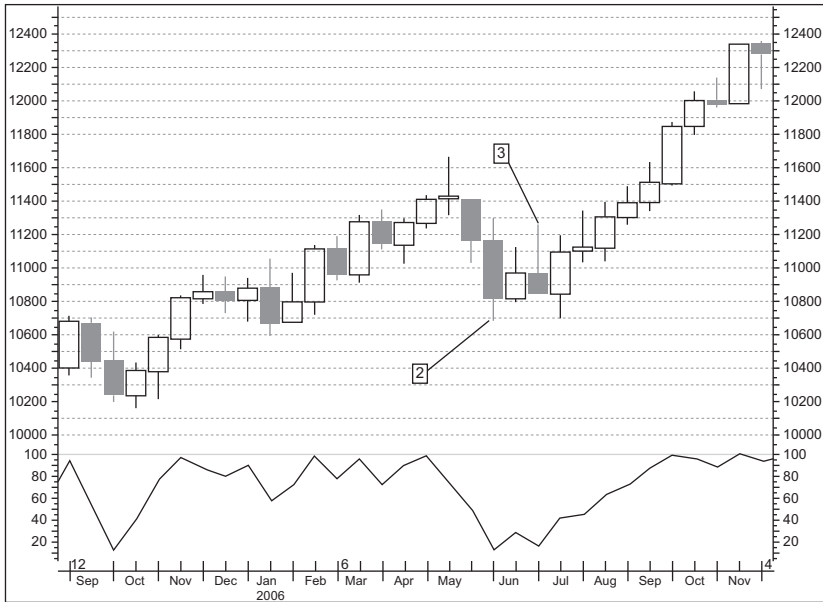
Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

Industrial Average. At point 1, the two-week interval (interval  $t$ ) chart falls by seven bars and stays in the bear market. After rising to point 2, the one-week interval (interval  $t-1$ ) chart reaches ghost-B and is up by four bars while the MACD histogram remains negative. As a result, the bear market cap is reached and the market falls subsequently.

Figure 4.9 displays the weekly interval chart, which falls after reaching ghost-B with the MACD histogram in the negative at point 2.

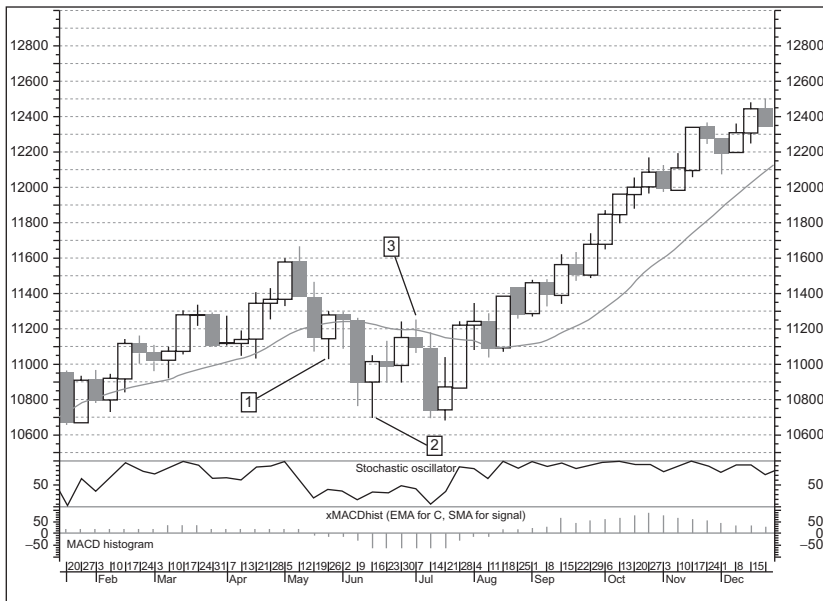
Figures 4.10, 4.11 and 4.12 illustrate the working of condition 5 in the bear market cap rule. The charts are drawn with data from the Dow Jones Industrial Average. The weekly interval reaches ghost-A at point 1; i.e., the two-day interval falls by virtual eight bars. From point 1, the two-day interval rebounds for three rising bars, then falls to a new low. As a result, the two-week interval is signaled to have moved into the bear market.

At point 2, the market rebounds while in the two-week bear market. The two-day interval rises by eight bars at point 3, and completes three



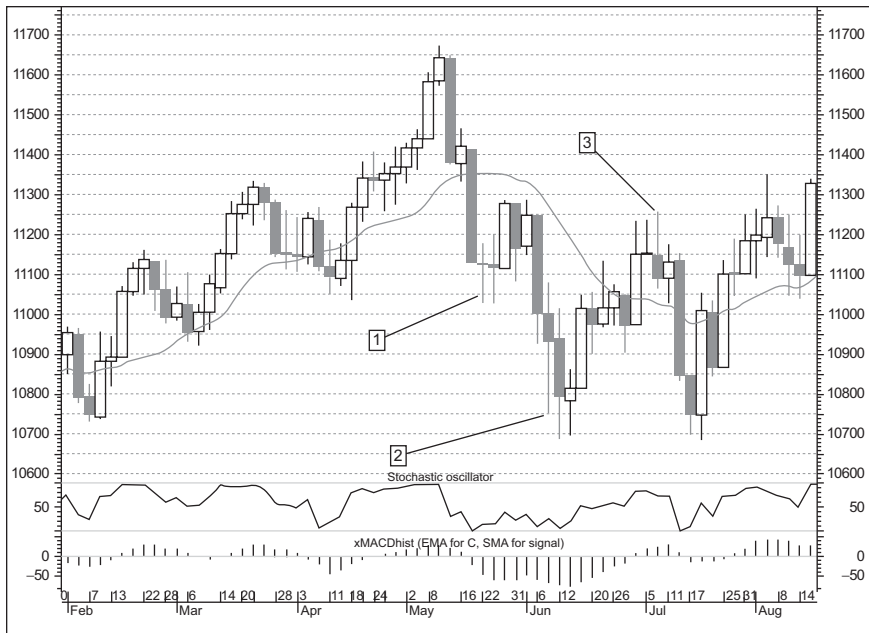
**Figure 4.10** Two-week interval bear market cap

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 4.11** The weekly interval reaches stochastics-B

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 4.12** Two-day interval rising by eight bars to the bear market cap

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

rising waves in the daily interval chart, reaching ghost-B in the mean-time. The market falls after reaching the two-week bear market cap.

Figure 4.10 displays the two-week chart in the bear market at point 3 to cap the temporary pause-up.

Figure 4.11 displays the weekly interval, which falls to ghost stochastics-B at point 1. Thus, at point 1, the two-day interval declines by virtual eight bars. Stochastics are displayed, rather than ghost stochastics. But it is easy to check with the eye that ghost stochastics-B is reached at point 1.

Figure 4.12 shows the market falling at point 3 after rising for eight bars in the two-day interval, three waves in daily interval (not shown). The daily interval waves can be seen from the two one-bar pause-downs in the two-day interval chart. The final top off at point 3 is a result of the market reaching the two-week interval bear market cap.

Two points should be stressed when the bear market cap rule is applied. First, the rule applies only when the overall decline has not yet been completed and the rebound is only temporary. Once the



decline is completed and the market starts the bottoming-up rebound, the above rule no longer applies; even when one or many of the above conditions are met, the market may continue to rise, or resume the rise after a brief pausing-down. How to evaluate whether a rebound is only temporary will be discussed later.

Second, the above topping-off point is the maximum up point that is possible. Frequently, the market will top off before reaching that maximum point specified in any one of the six conditions listed above. This point will be elaborated later.

Similar to the caps stated in the bear market cap rule with an unfinished downward trend, there are also floors that can be stated for deviations from an unfinished positive trend. The following six conditions characterize the maximum downside on a temporary pausing-down.

**Bull market floor rule I:** Suppose the interval  $t$  chart is in the bull market and the overall market rise has not been completed. On a temporary pause-down, the market is expected to bottom-up under one of the following six conditions:

1. Interval  $t-2$  chart falls for eight bars, quasi-eight bars or virtual eight bars, reaching stochastics-A or ghost-A; the MACD histogram of the interval is positive.
2. Interval  $t-2$  chart falls for eight bars, quasi-eight bars or virtual eight bars, reaching stochastics-A or ghost-A; the price line of the interval remains above the MA-14 line.
3. Interval  $t-1$  chart falls by four bars, reaching stochastics-A or ghost-A; the MACD histogram of the interval is positive.
4. Interval  $t-1$  chart falls by four bars, reaching stochastics-A or ghost-A; the price line of the interval remains above the MA-14 line.
5. Interval  $t-2$  chart falls for eight bars or more, quasi-eight bars or virtual eight bars, reaching stochastics-A or ghost-A; three falling waves are completed in either interval  $t-2$  charts, or the interval  $t-3$  chart.
6. Interval  $t-2$  chart falls by R9 bars.

As in the case of the bear market cap rule, there are two similar points to be noted in applying the bull market floor rule. First, the above rule applies only when the upside has not been completed. Otherwise, it is possible for the market to continue to fall to a new low, with or without temporary pause-ups at the bull market

floor. Second, in the case when the upside has not been completed, bottoming-up may start before any of the above conditions are reached; the above conditions are sufficient, but not necessary for the bottoming-up.

Since a countertrend movement can be a permanent trend reversal, the bear market cap and bull market floor do not always apply. Judgment has to be made as to whether the countertrend movement is temporary before the rule can be employed. This requirement, however, does not reduce the power of the rule. First, looked at from the other way around, the bear market cap provides a testing point for whether the rise is a permanent reversal of the upside trend; the bull market floor provides a testing point for whether the fall is a permanent reversal of the rising trend. This testing point is of great value for analyzing the establishment of a trend. Second, conditions will be stated that can help to determine whether a countertrend is only temporary. But more building blocks will have to be introduced before the discussion of the rules that govern the nature of market movements.

#### **4.4 TRIPLE SCREEN SYSTEM UNDER FULL VIEW**

Before the third building block of FVITA is introduced in the next chapter, let us take another look at the triple screen system. With the concept of bounded bear market and bounded bull market defined and the maximum deviation away from a trend spelled out, it is easy to see how Elder's Triple Screen Trading System works when it does, and when and why it may fail. Keep in mind the factor-of-five rule that relates the neighboring two screens in the triple screen system. The rule is comparable to the relationship governing the time intervals of  $t-4$ ,  $t-2$  and  $t$  in the Full View chart system, with interval  $t-4$  as the ripple screen, interval  $t-2$  as the wave screen and interval  $t$  as the tide screen.

Assuming that the tide screen, or interval  $t$ , is on a positive trend, the triple screen system suggests taking long positions after the market pauses down to reach stochastics-A in the wave screen, or interval  $t-2$ . The strategy works under three scenarios. First, interval  $t$  is on a positive trend and interval  $t-1$  has not reached a balanced market yet, i.e., remaining bullish. Interval  $t-2$  reaching stochastics-A for virtual eight down-bars in interval  $t-3$  is the most that the market would deviate away from its

upward trend; a return to the original trend thus is expected after the market falls to reach stochastics-A in interval  $t-2$ , as suggested by the triple screen system. Second, interval  $t$  is on a positive trend and the overall upside is not completed yet, but interval  $t-1$  has already reached a balanced market on the rise. When the market moves towards the opposite direction, the maximum deviation towards the downside is falling by eight bars in interval  $t-2$  before being pulled up by bullish interval  $t$ . Most times, interval  $t-2$  will reach its stochastics-A first before falling by eight bars, but may stay in the over-sold zone for a while before displaying signals for rebounding under traditional analysis of stochastics after falling by eight bars. The triple screen system generates the correct strategy again. Third, interval  $t$  is on a positive trend with the overall upside incomplete, but interval  $t-1$  has already risen to the balanced market. The market falls to reach stochastics-A in interval  $t-2$  and rebounds before falling by eight bars in the interval; market bottoms out before reaching the bull market floor. This is expected, to be made clear later, when the original positive trend is a result of a bottoming-up rebound in interval  $t$  or higher. But it may occur even when interval  $t$  has a positive trend in a temporary pause-up.

On the other hand, the triple screen trading strategy will not work under the following scenarios. First, the strategy is designed without acknowledging the limited range of a trend. Therefore, it implicitly assumes that the positive trend of the tide screen, or interval  $t$ , continues to be in force even after the interval reaches the balanced market. After interval  $t$  reaches the balanced market, or the upside has been completed, the market can move in the opposite direction for much longer than what is suggested by stochastics-A in interval  $t-2$ , or the wave screen. The normal analysis of a stochastics indicator in the over-sold zone in the wave screen will fail to generate the right signal if the downside has not yet been completed on the fall. Second, the fall may be permanent after reaching the balanced market in interval  $t-1$ , with or without interval  $t$  being still in the bull market. In this case, a temporary pause-up may occur after stochastics-A is reached in interval  $t-2$ , the wave screen, but only to be followed with a further fall. Third, the strategy will miss out on the opportunities when the market falls and rebounds before reaching stochastics-A in interval  $t-2$ . Finally, with interval  $t-1$  in the balanced market, the market falls to stochastics-A before reaching a balanced market in interval  $t-2$ . The bear market floor has not been reached. Therefore, a further fall is possible after a brief pause-up.

**NOTE**

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1. R9 up-bars is equivalent to DeMark's selling setup; R9 down-bars is the same as DeMark's buying setup, (DeMark, *The Science of Technical Analysis*). Sequential, Sell Setups and Buy Setups are proprietary studies created by Tom DeMark and owned by Market Studies LLC at [www.marketstudies.com](http://www.marketstudies.com).

## CHAPTER 5

# Market Turning Points and Duration of Pauses

The interval charts introduced in Chapter 3 and the bounded bull and bear markets introduced in Chapter 4 are two important building blocks of FVITA. Together, they provide a broad structure that captures market dynamics driven by different trends with a clear delineation of boundaries of influence of each trend. The discussion turns now to major market movements within this structure, between boundaries of influence. It will provide the third building block of FVITA. The focus in this chapter is on market turning points and the classification of countertrend movements at those points according to the depth of the countermovements. The former will help to anticipate countermovements. The latter will be very useful in signaling temporary pauses.

### 5.1 SUPPORT AND RESISTANCE

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Either on falling or rising, the market most times meets countertrend forces at past turning points, defined as resistance and support levels. They are called resistance when the market rises to reach the levels associated with those turning points; they are called support when the market falls to reach the levels associated with the turning points. Whether the turning point is formed as a local high or local low is a factor that will not be considered here.

When the market rises to stochastics-B and reaches a resistance level in an interval, it is likely to face selling pressure at least temporarily. Similarly, when the market falls to stochastics-A in a given interval and reaches a support level of the interval, it is likely to face buying

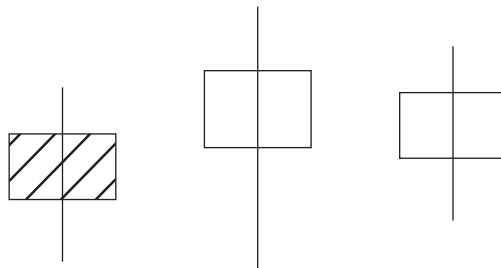
pressure at least temporarily. If there is a clear pattern of waves on the way to reach the resistance or support, the countertrend movement most times occurs after the completion of a wave or quasi-completion of a wave, to be defined shortly, at the resistance or support level.

To become a resistance or support level for interval  $t$ , the associated local high or low must have been reached after the market moved by at least two bars in one direction before turning towards the other direction. The two-bars-in-one direction requirement is also an important condition to define a wave, to be introduced shortly. Simple as it may appear, an accurate definition of two bars in one direction requires some careful thinking. To get the two-bar definition right is important for precise timing, as it will also define an interval chart to be associated with each observed wave. The interval will be used for counting the bars for the completion of a wave, which is required for timing the start of market turning points. In the following, six cases are provided to describe different variations of the two-bar countermovement. People who are not concerned about the detailed technicality can jump to the next section without compromising the broad understanding of the analytical system being presented.

For the six cases presented, the difference between one case from the previous case is *italicized* in the description. In the accompanying charts, the filled bars are rising bars that close higher than the open. The blank bars are falling bars that close below the open.

#### Case 1:

1. The last bar closes below its opening price.
2. The high of the last bar is below the high of the bar before.
3. The last bar closes lower than the close of the bar before.
4. The opening price of the last bar is below the opening price of the bar before.
5. The second last bar closes lower than the opening price.



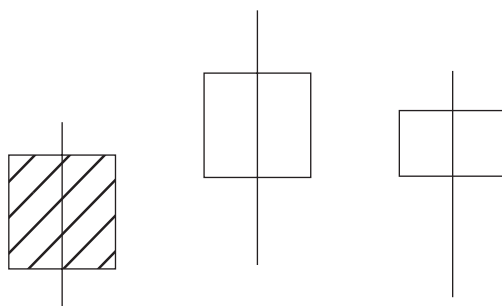
**Figure 5.1** Two falling bars, case1

Figure 5.1 shows the candlestick chart of two falling bars defined in case 1.

**Case 2:**

1. The last bar closes below the opening price.
2. The high of the last bar is below the high of the bar before.
3. *The low of the last bar is lower than the low of the bar before.*
4. The opening price of the last bar is below the opening price of the bar before.
5. The second last bar closes lower than the opening price.

Figure 5.2 shows the candlestick chart of two falling bars defined in case 2.



**Figure 5.2** Two falling bars, case 2

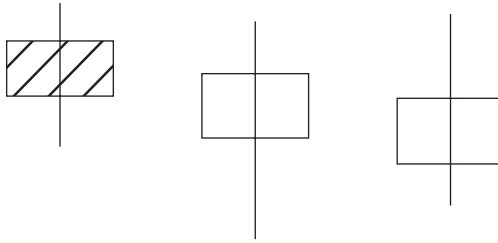
The difference between case 2 and case 1 is that in case 2, the last bar reaches a lower low than the previous bar while in case 1, the last bar closes lower than the previous bar.

**Case 3:**

1. The last bar closes below its opening price.
2. The closing price of the last bar is below the closing price of the previous bar.
3. *The third last bar has the highest high among the last three bars.*

Figure 5.3 shows the candlestick chart of two falling bars defined in case 3.

Compared with case 1 and case 2, in case 3, the highest bar in the last three bars is reached in the third last bar, rather than in the second last bar.

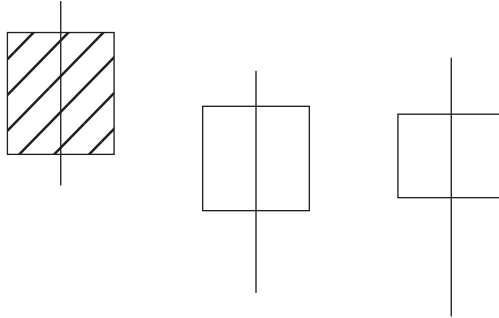


**Figure 5.3** Two falling bars, case 3

**Case 4:**

1. The last bar closes below its opening price.
2. *The low of the last bar is below the low of the previous bar.*
3. The third last bar has the highest high among the last three bars.

Figure 5.4 shows the candlestick chart of two falling bars defined in case 4.



**Figure 5.4** Two falling bars, case 4

Comparing case 4 with case 3, in case 4 the last bar has a lower low than the previous bar, while in case 3 the last bar closes lower than the previous bar.

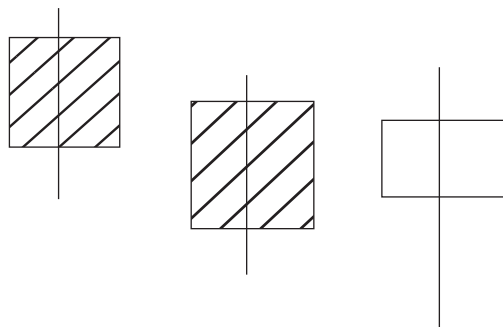
**Case 5:**

1. The third last bar has the highest high among the last three bars.
2. The last bar closes below the previous closing price.
3. *The second last bar closes below the close of the third last bar.*



Figure 5.5 shows the candlestick chart of two falling bars defined in case 5.

In case 5, there are two consecutive decreases in closing price without a new high after the high in the third last bar.

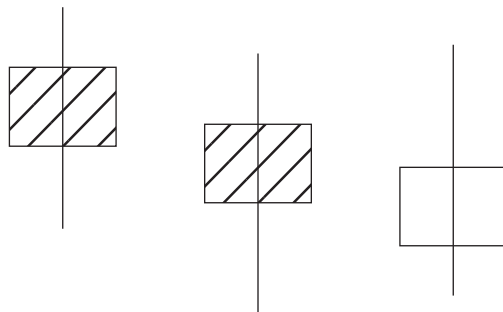


**Figure 5.5** Two falling bars, case 5

#### Case 6:

1. The third last bar has the highest high among the last three bars.
2. *The opening price of the last bar is below the opening price of the previous bar.*
3. *The opening price of the second last bar is below the opening price of the third last bar.*

Figure 5.6 shows the candlestick chart of two falling bars defined in case 6.



**Figure 5.6** Two falling bars, case 6

In case 6, there are two consecutive decreases in the opening price with no new high after the high of the third last bar.

Similarly, there are six cases of two rising bars. These are symmetrical to the six cases of falling bars so will not be discussed in detail here. With the two falling and rising bars clearly defined, the description of the resistance and support is complete. As mentioned, the two-bars-in-one direction definition will also be used to define interval-specific waves.

## 5.2 BOLLINGER BANDS<sup>1</sup>

Similar to resistance and support levels, Bollinger Bands are where counterforces are likely to be met against a trend. Bollinger Bands are formed by two lines centered around the MA of the last N observations. Bollinger's original study uses  $N=20$ , which is still used by most people when employing Bollinger Bands. But based on the results of empirical tests,  $N=5$  is used in this book for FVITA.

Middle band of Bollinger Bands: The center line of the Bollinger Band is given by MA-5, the five-period moving average.

Upper band of Bollinger Bands (Bollinger upper band): the upper bound of the Bollinger Bands is formed by  $MA-5 + 2 \text{ dev}(5)$ .

Lower band of Bollinger Bands (Bollinger lower band): the lower bound of Bollinger bands is formed by  $MA-5 - 2 \text{ dev}(5)$ .

In the above definitions,  $\text{dev}(5)$  is the standard deviation of the closing price of the last five observations. Bollinger Bands are standard indicators in charting packages offered by almost all chart providers.

Figure 5.7 shows an example of Bollinger Bands defined over the five-period moving average. The chart is drawn with 2007 daily data from the Shanghai Stock Market Composite Index.

Normally, Bollinger Bands are used as an oscillator. In its simplest interpretation, if the market rises to reach the upper band, it is regarded as having been overbought and is expected to fall towards the center line on weakening demand. On the other hand, if the market falls to the lower band, it is regarded as being oversold, and is expected to be pushed up towards the middle by increasing demand.

Similar to the case of all the other indicators used in the existing technical analysis, the use of Bollinger Bands is accompanied by a high degree of uncertainty as a result of failing to consider the influence from high-order intervals. For example, if the market rises with higher order intervals in positive trends, it may not pause down after reaching a Bollinger upper band. Even if there is a pause-down, the upside is likely to resume quickly, not necessarily falling back to the middle band. Similarly, if the market falls due to higher order



**Figure 5.7** Bollinger Bands

Source: Data and graphics used with permission from eSignal

negative trends, there may not be any pause-up at the Bollinger lower band, or just a brief pause-up before further downside. Therefore, like the other indicators, Bollinger Bands should not be used alone without paying attention to high-order conditions. Otherwise, the forecast will not be reliable.

However, if used properly and used together with other information, Bollinger Bands are very useful tools for marking possible pausing points or trend reversal points under various conditions, to be specified later. For example, if the upside is limited with an unfinished decline, the Bollinger upper band of a given interval may serve as a pausing point even when the rebound is driven by higher order conditions and the topping-off point has not been reached. Furthermore, the Bollinger upper band in interval  $t$  will most likely cap the upside if the rebound starts with interval  $t+1$  in the bear market and the overall decline has not yet finished.

Bollinger Bands will be more effective as a market turning point if combined with the MA-14 line and the MACD histogram.

**Bollinger upper band+2:** When the price line reaches the Bollinger upper band, if the MACD histogram remains negative and the Bollinger upper band is below the MA-14 line, then the Bollinger upper band+2 condition is said to hold.

**Bollinger lower band+2:** When the price line reaches the Bollinger lower band, if the MACD histogram remains positive and the Bollinger upper band is above the MA-14 line, then the Bollinger lower band+2 condition is said to hold.

**Bollinger upper band+1:** When the price line reaches the Bollinger upper band, if either the MACD histogram remains negative or the Bollinger upper band is below the MA-14 line, then the Bollinger upper band+1 condition is said to hold.

**Bollinger lower band+1:** When the price line reaches the Bollinger lower band, if either the MACD histogram remains positive or the Bollinger upper band is above the MA-14 line, then the Bollinger lower band+1 condition is said to hold.

Depending on whether the running trend has been completed, Bollinger Bands may either serve as a trend reversal point or as a pausing point.

**Bollinger upper band as a pausing point:** If the market rises from an interval  $t$  bear market and reaches an interval  $t-2$  or interval  $t-1$  stochastics-B at a Bollinger upper band+1 or Bollinger upper band+2 of the same interval or the next higher order interval, most times there will be a downward countermovement.

**Bollinger upper band as topping-off point (bear market caps rule II):** Suppose the overall decline has not been completed and the market rises from an interval  $t$  bear market for a temporary pause-up. The market is expected to top off under one of two conditions:

1. Reaching interval  $t-1$  or  $t-2$  Bollinger upper band+2 and rising by eight bars, quasi-eight bars or virtual eight bars in interval  $t-2$ ;
2. Reaching interval  $t$  Bollinger upper band+2 and rising to interval  $t-1$  stochastics-B.

**Bollinger lower band as pausing point:** If the market falls from an interval  $t$  bull market and reaches interval  $t-2$  or higher order interval stochastics-A at Bollinger lower band+1 or Bollinger lower band+2 in the same interval or the next higher order interval, most times there will be an upward countermovement.

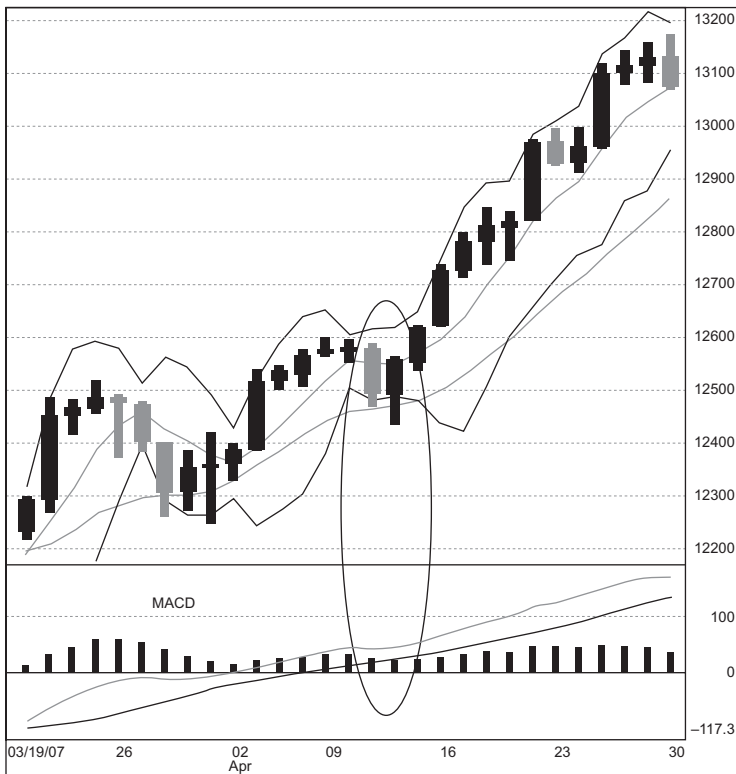
**Bollinger lower band as bottoming-up point (bull market floors rule II):** If the overall rise has not been completed and the market falls from

an interval  $t$  bull market for a temporary pause-down, then the bottom-up is expected when one of the following two conditions are met:

1. Reaching interval  $t-2$  or  $t-1$  Bollinger lower band  $+2$  and falling by eight bars, quasi-eight bars or virtual eight bars in interval  $t-2$ ;
2. Reaching interval  $t$  Bollinger lower band  $+2$  and falling to interval  $t-1$  stochastics-A.

The Bollinger upper band as topping-off point rule provides the seventh and eighth conditions that set up the cap for a temporary rebound with interval  $t$  in the bear market. The Bollinger lower band as bottoming-up point rule provides the seventh and eighth conditions that set up the floor for a temporary pause-down with interval  $t$  in the bull market.

Figure 5.8 shows the condition of a Bollinger lower band  $+2$  at the circled location. The market reaches the Bollinger lower band with

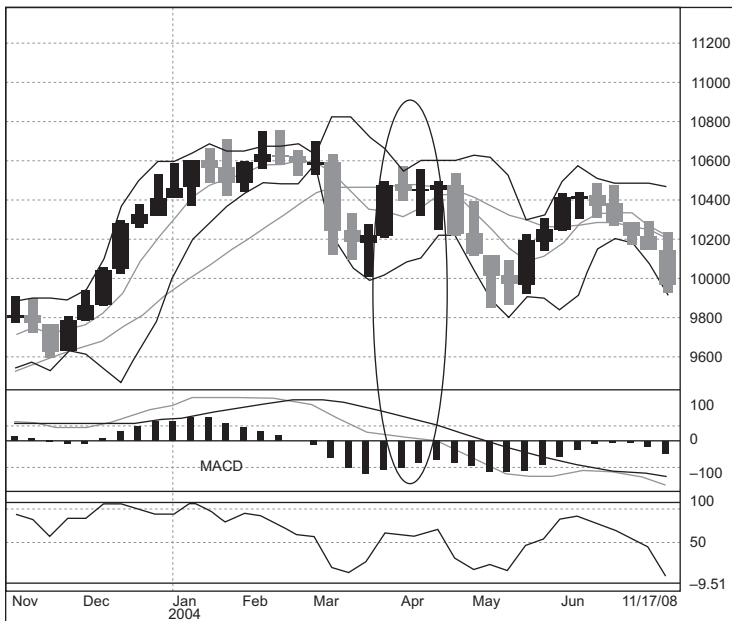


**Figure 5.8** Bollinger lower band  $+2$

Source: Data and graphics used with permission from eSignal

the price line still above the MA-14 line and the MACD histogram in the positive. The chart is drawn with 2007 daily data from the Dow Jones Industrial Average.

Figure 5.9 shows the condition of the Bollinger upper band+1. The market reaches the Bollinger upper band with MA-14 (given by the light line) already below the band, but the MACD histogram is still in the negative.



**Figure 5.9** Bollinger upper band+1

Source: Data and graphics used with permission from eSignal

### 5.3 WAVES

A prominent feature of the price actions in the financial market is the falling and rising waves. On a rising trend, the market often pauses down before rising further; the pause-downs often occur at fairly constant intervals and with similar durations for the fall and the subsequent rise. Similarly on a falling trend, the market often pauses

up before falling further, with fairly constant durations in both directions. The tendency towards finishing with similar durations both for the rising swings and the pause-downs is quite consistent if without interference from extraneous factors such as the reaching of higher order resistance or other turning points. The waves are an important force, although not the only force, that regulates the market.

An accurate understanding of waves can play an important role in determining the exact timing of market dynamics. For example, in condition 5 of the bear market cap rule, the fall starts after the completion of the rising waves; similarly, in condition 5 of the bull market cap rule, the final rise happens after the completion of the falling waves. Additionally, whether there are waves on a continuation pattern or not will help to determine the exact duration of the positive trend before the associated interval reaches the balanced market. The market turning point after reaching the balanced market in interval  $t$  will be reached slightly earlier after eight bars, instead of  $R9$  bars, if the trend comes with waves of interval  $t-1$  on the way.

Despite being a prominent feature of the market dynamics, the term “wave” is used rather loosely in the existing technical analysis. Partly due to the big gaps between conventional calendar units that are used in constructing interval charts, and partly because the general precision of the traditional technical analysis is not high, there is no pressing need to be precise about waves; a rough inspection of the charts would be enough to differentiate a wave in the weekly chart from one that can be observed only on the daily chart, and provide a good enough measure about the size of the waves. Furthermore, because there are no good explanations when a wave falls short of or extends beyond expected length, it does not help much to be more precise about the duration of a wave.

The precise timing of the completion of a wave is closely related to the duration of the pause between waves. With a more refined classification of trends of different sizes and a better understanding of the failures in the completion of waves under the FVITA system, a precise definition of waves becomes meaningful. It will help to better utilize waves for more accurate market timing. Furthermore, a new feature in wave analysis also emerges with FVITA and requires a precise definition of waves. FVITA makes it possible to draw information from incomplete waves; the failure of a wave to complete its expected duration offers important information about the forces behind the countermovement, and thus can help to forecast the duration of the countermovement.

In defining waves, it proves to be convenient to associate the waves with different intervals depending on the duration of the pauses between waves. Specifically, if between two rising waves there is a downward pause of two days, or two bars in the daily interval chart, the waves will be called daily interval waves. If between two rising waves, there is a downward pause of four days, or two bars in the two-day interval chart, the waves are called two-day interval waves. In general, the definitions for waves are as follows:

**Interval t rising waves:** If between two rising waves, there is a downward pause of two bars in interval t charts, the waves are called interval t rising waves.

**Interval t falling waves:** If between two falling waves, there is an upward pause of two bars in interval t charts, the waves are called interval t falling waves.

**Wave duration:** In interval t rising waves, a wave is complete when the market has risen by the same number of rising bars as in the last rising wave. Similarly, in interval t falling waves, a wave is complete when the market has fallen by the same number of bars as in the last falling wave.

When the duration of a wave is used as a timing device, the above rule can frequently make a notable difference in terms of the profit margin of a trade. The counting of a wave may differ by two bars if done on the wrong interval. This can be a large margin of error that should be avoided when the wave is associated with an interval larger than one's trading interval.

Sometimes, the two-bar pause between two waves may not come in exactly the same forms as the six cases discussed earlier. Two of the variations that are observed frequently are 1+1 pauses, realigned (hidden) 1+1 pauses and realigned (hidden) two-bar pauses.

**1+1 pause-up:** After rising for one bar—closing higher than the open, the market falls for one bar without making a new low against the low of the rising bar, followed by rising for one bar again without making a new high compared with the first rising bar.

**1+1 pause-down:** After falling for one bar—closing lower than open, the market rises for one bar without making a new high, followed by falling for one bar again without making a new low compared with the first falling bar.

**2+2 pause-up:** After rising for two bars, falling for one or two bars then rising again for two bars without breaking the high reached by the first two rising bars.

**2+2 pause-down:** After falling for two bars, rising for one or two bars then falling again for two bars without breaking the low reached by the first two falling bars.



The 1+1 and 2+2 pauses may not come exactly in the defined form. In forming a 1+1 pause-up, for example, after one bar up, the following falling bar may make a marginal new low before the second rising bar. This should be admissible as a variation of a 1+1 pause-up. Similar variations may occur to a 1+1 pause-down and 2+2 pauses.

**Interval t realigned one bar down (or hidden one bar down):** Interval t does not display visible falling observations, but the interval  $t-1$  chart shows two falling bars; or alternatively, two of the interval  $t-1$  bars can be put together to construct an interval t falling bar.

**Interval t realigned two bars down (or hidden two bars down):** There is only one visible falling bar in interval t, but there are three or four falling bars in the interval  $t-1$  chart that can be used to construct two falling interval t bars.

**Interval t realigned 1+1 bars down (or hidden 1+1 down):** There are one or no falling bars visible on the interval t chart. There is a 2+2 pause-down on the interval  $t-1$  chart.

Similarly, hidden one bar up (realigned one bar up), hidden two bars up (realigned two bars up) and hidden 1+1 bars up (realigned 1+1 bars up) can be defined. The process will not be repeated here. Hidden bars have exactly the same implication as normal visible bars in analyzing the chart patterns. Therefore, in the rest of the book, the reference to one bar applies to one hidden bar; the reference to two bars applies to two hidden bars; the reference to 1+1 and 2+2 bars applies to 1+1 and 2+2 hidden bars, respectively.

With a 1+1 pausing-down, the market is rising with more strength than with a two-bar pausing-down. But as the pausing-down that separates two rising waves, a 1+1 pausing-down on the interval t chart is the same as a two-bar pausing-down on the same interval chart; both are followed by another wave in interval t. Therefore, when waves are being analyzed, falling by two bars is the same as falling by 1+1 bars. Furthermore, falling by two hidden bars is the same as falling by two bars in the normal, visible way. Falling by hidden 1+1 bars is the same as falling by 1+1 bars in the normal, visible way.

Similarly, when pausing-up between falling waves is being analyzed, pausing by two rising bars is the same as pausing by 1+1 rising bars; pausing-up by two hidden bars is the same as pausing-up by two bars in the normal visible way; pausing-up by 1+1 hidden bars is the same as pausing-up by 1+1 bars in the normal, visible way.

There are times, however, when falling by 1+1 bars may have completely different meanings from falling by two bars. This happens when evaluating whether a rebound is the bottoming-up rebound or just a temporary pausing-up. Similarly, the difference between 1+1

pausing-up and pausing-up by two bars is important when evaluating whether a fall is topping off, or just temporarily pausing-down. This will be discussed later in more detail.

Another point worth noting is that interval *t* rising waves may occur after interval *t* is already in the balanced market and higher order intervals are in the bull market, being the driving force behind the rise. In this case, the market is no longer moved by the factors behind interval *t*; the indicators of higher order intervals need to be studied for market direction and the duration of the rise. Associating interval *t* with the waves is for the convenience of reference and the accurate counting of the bars for the completion of a wave; it does not link the interval to the driving force behind the rising waves.

In the existing technical analysis, however, daily rising waves are discussed as if they were an indication of the market being driven by forces associated with the daily interval; monthly rising waves are referred to as if they were an indication that the market dynamics are driven by forces associated with the monthly interval. In fact, monthly waves are not necessarily driven by a monthly trend; daily waves are not necessarily driven by a daily trend. Whether these rising waves will be completed in large part depends on conditions of higher order intervals. Being blind to this fact is the reason that the existing analyses are incapable of offering an explanation about the incomplete or extended waves. As a result, not only can they not be used to anticipate any possible early termination of unfinished waves, but they also miss out on the opportunity to use the important information signaled by an incomplete wave to infer market actions ahead.

Besides higher order conditions, resistance and support levels can affect the completion of a wave. If a resistance level is reached one bar before the completion of the wave, the wave will start the downward pause as if it were completed. Similarly, if a falling wave meets support with one bar remaining before completion, the upward pause will occur the same way as if the wave were completed.

**Quasi-rising wave:** With one bar short of the completion of a rising wave, a resistance is reached. In this case, the pausing-down will occur after the completion of the second last bar of the wave.

**Quasi-falling wave:** With one bar short of the completion of a falling wave, a support is reached. In this case, the pausing-up will occur after the completion of the second last bar of the wave.

Quasi-waves are an earlier completion of waves, rather than a termination of unfinished waves. That is, they are considered complete waves. In the following discussion, a quasi-falling wave will be

treated the same as a complete falling wave; a quasi-rising wave will be treated the same as a complete rising wave. If not otherwise noted, when the completion of a wave is mentioned, it also applies to the case of a quasi-completion of a wave.

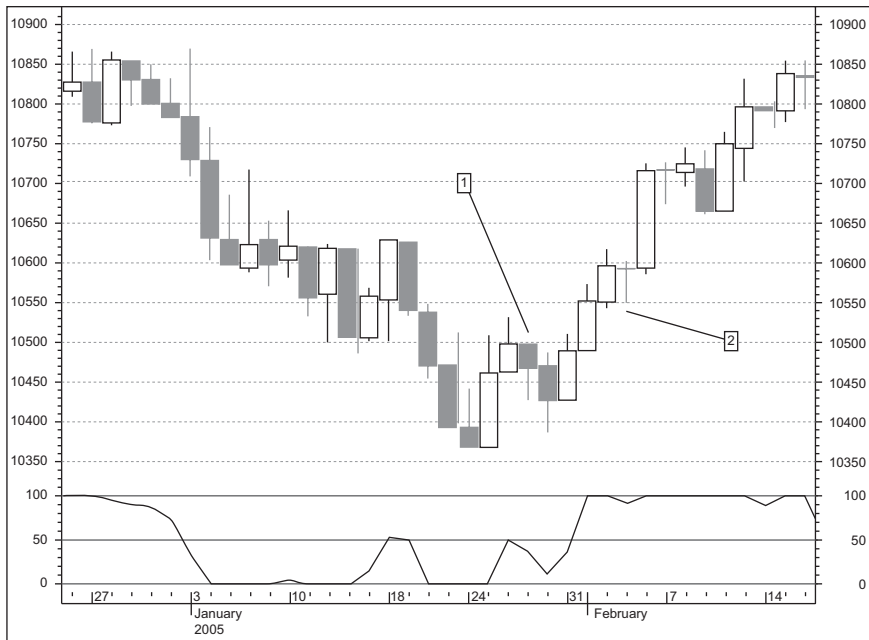
The correct judgment about an incomplete wave is important as it signals the reach of a market turning point in a higher order interval. The identification of the interval behind a countermovement is very helpful in anticipating the duration of the countermovement. Broadly speaking, if on a rising trend, the market falls by two bars before completing a wave in interval *t*, an upward market turning point of a higher order interval has been reached. If on a falling trend, the market rises by two bars before completing a wave in interval *t*, a downward market turning point of a higher order interval has been reached.

Normally, it is more likely to observe a slightly longer second wave than the first wave, and shorter third and fourth waves. But the resistance and support is an important factor in deciding the length of a wave relative to the previous wave. Shortly before reaching resistance or support, the wave may be extended to reach resistance or support. At resistance or support, if turning points of higher market intervals are being reached at the same time, then the wave may be shortened.

It is possible that after pausing-down for two falling bars on an interval *t* chart following the first wave, the rise will continue without a clear pause-down or with a pause-down for just one bar following the second wave. Most times this happens when the bottoming-up rebound is confirmed after the first two-bar pause-down. The confirmation of a bottoming-up rebound will be discussed later.

There is a second case where the second rising wave is completed but the market continues to rise without a pause or only with a one-bar pause. This is when the pause-down between the first and second wave completes the overall fall; the bottoming-up rebound starts at the same time as the second rising wave. Therefore, the second wave is a completely new start, not a continuation of the market movement associated with the first wave.

Figure 5.10 shows that the market starts the bottom-up rebound at point 1, where it completes the overall decline after pausing-down for two bars. The market does not stop at point 2, as the segment from point 1 to point 2 should not be considered as a second wave following the rising wave before the fall towards point 1. The chart was drawn on 2005 daily data from the Dow Jones Industrial Average.



**Figure 5.10** No pause-down after a wave

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

It is worth noting that the waves may sometimes appear to be mixed. For example, after an interval  $t$  rising wave and two pausing-down bars, the market rises to the completion of an interval  $t-1$  wave instead of another interval  $t$  wave before falling. This phenomenon mostly occurs after high-order turning points are being reached, for example, after eight up-bars in interval  $t+1$  with the MACD histogram remaining negative, or after a rising wave in interval  $t+1$  is completed.

Similarly, on declines following two up-points in interval  $t$ , the market may rebound after completing an interval  $t-1$  wave, rather than completing an interval  $t$  wave if a higher order interval turning point has been reached.

After interval  $t$  completes three or four rising waves to reach an interval  $t+1$  turning point, there will be normally at least two falling pausing bars on the interval  $t+1$  chart.

Similarly, after the interval  $t$  chart completes three or four falling waves to reach an interval  $t+1$  turning point, normally there will be two pausing up-bars on the interval  $t+1$  chart.

## 5.4 TURNING POINTS AFTER EIGHT AND R9 OBSERVATIONS

Besides waves, there are two other forms of market continuation patterns, the completion of which are normally associated with market turning points. These other two market continuation patterns are closely related to each other; both are invisible under the traditional approach that employs countermovements to project further movements in the original direction in the form of waves or channels. One of the two new continuation patterns is a move of eight bars in one direction, with pauses towards the other direction on the way included in the eight bar counting. The other one is a move by R9 bars in one direction, with pauses towards the other direction on the way at most for one bar in each pause and all the bars being included in the counting towards the completion of the continuation pattern.

**Turning down after rising for eight+ points:** Normally at least two falling bars are expected if after falling by two bars or more, or falling to stochastics-A in interval  $t$ , the market rebounds to meet the following conditions:

1. Rising for eight bars, or quasi-eight bars;
2. The MACD histogram being negative, or the market price being below the MA-14 line, or interval  $t-1$  completing three rising waves.

Then, normally there will be at least two downward pausing points in interval  $t$ .

**Turning up after falling for eight+ points:** Normally at least two rising bars are expected if after rising by two bars or more, or rising to stochastics-B on an interval  $t$  chart, the market falls to meet the following conditions:

1. Falling for eight bars, or quasi-eight bars;
2. The MACD histogram being positive, or market price being above the MA-14 line, or interval  $t-1$  completing three falling waves.

In the above two cases, the bar counting may reach more than eight to complete a running wave. Furthermore, the turning points will be delayed slightly without the support of the second condition in the two cases stated above. In this case, the fall is expected after R9 up-bars; the rise is expected after R9 down-bars.

**Turning down after rising for R9 bars:** After falling by two bars or more, or falling to stochastics-A on an interval  $t$  chart, the market rebounds to meet the following conditions:

1. The MACD histogram being positive; market price being above the MA-14 line; and there being no interval  $t-1$  three rising waves;
2. Rising for R9 up-bars.

Then there may be one or two downward pausing points.

**Turning up after falling for R9 bars:** After rising by two bars or more, or rising to stochastics-A on an interval  $t$  chart, the market falls to meet the following conditions:

1. The MACD histogram being negative; market price being below MA-14; and there being no interval  $t-1$  three falling waves;
2. Falling for R9 down-bars.

Then there may be one or two upward pausing points.

## 5.5 THRUST

The three patterns stated above—waves, eight bars and R9 bars—are the major continuation patterns with consistent tendency towards completion on the one hand, and strong anticipation for countertrend market movements after the completion on the other. It is convenient for later discussions to use the term “upward thrust” to refer to all three patterns when the market moves upward. Similarly, “downward thrust” will be used to refer to the three symmetric cases to the downside. “Thrust” will be used to refer to either upward thrust or downward thrust.

**Upward thrust:** A positive or upward thrust of interval  $t$  refers to the tendency of the market to complete the following continuation patterns:

1. Completing a rising wave, or quasi-rising wave in interval  $t$ ;
2. Rising by eight bars (or quasi-eight bars, virtual eight bars) with the MACD histogram or the difference between the price line or the MA-14 line in the negative in interval  $t$ ;
3. Reaching interval  $t+1$  Bollinger upper band  $+2$ ; and rising by eight bars, quasi-eight bars or virtual eight bars in interval  $t$ ;

4. Rising to interval  $t+1$  stochastics-B and reaching interval  $t+2$  Bollinger upper band+2 and with interval  $t+2$  in the bear market;
5. Rising by R9 bars with the MACD histogram and the difference between the price line and the MA-14 line in the positive in interval  $t$ .

**Downward thrust:** A negative or downward thrust of an interval  $t$  refers to the tendency of the market to complete the following continuation patterns:

1. Completing a falling wave or a falling quasi-wave in interval  $t$ ;
2. Falling by eight falling bars (or quasi-eight bars, virtual eight bars) with the MACD histogram or the difference between the price line and the MA-14 line in the positive in interval  $t$ ;
3. Reaching interval  $t+1$  Bollinger lower band+2; and falling by eight bars, quasi-eight bars or virtual eight bars in interval  $t$ ;
4. Falling to interval  $t+1$  stochastics-A and reaching interval  $t+2$  Bollinger lower band+2 and with interval  $t+2$  in the bull market;
5. Falling by R9 bars with the MACD histogram and the difference between the price line and the MA-14 line in the negative in interval  $t$ .

The market has a strong tendency towards finishing a running thrust. Therefore, most countermovements, temporary or permanent, occur after completing a thrust. At the same time, after completing a market thrust, most times there will be at least a temporary countermovement against the running trend. Therefore, there is a close association between the completion of a thrust and a counter-market movement. For this reason, the completion of a thrust means the reach of a market turning point in the associated time interval.

Higher order thrusts dominate lower order thrusts. Consequently, thrusts, particularly waves, are not always completed, and the market may turn against the current trend or continuation pattern before its completion in a lower order time interval as a result of high-order intervals completing their thrusts and reaching market turning points.

**Aborted rising wave rule I:** When the price line in interval  $t$  falls by three bars before the completion of a rising wave, the wave is referred to as being aborted. When an interval  $t$  wave is aborted, it signals the

start of a fall generated by the market turning point of a higher order interval after completing an upward market thrust.

This statement applies when the market has risen by at least eight bars in interval  $t+1$  after starting an interval  $t+1$  or higher interval thrust. This is required to rule out the case of a pause in interval  $t$  after rising by eight bars or R9 bars in the interval.

**Aborted rising wave rule II:** Suppose interval  $t+n$  completes a market thrust to reach a turning point, with intervals of size larger than  $t$  and smaller than  $t+n$  having all completed an upward thrust or having no incomplete thrust. If interval  $t$  falls by two bars before the completion of a rising wave, then the rising wave of interval  $t$  is aborted; a fall associated with the turning point of interval  $t+n$  has started.

The difference between the aborted rising wave I rule and the aborted rising wave II rule is that in the latter it can be clearly judged that interval sizes of a higher order than  $t$  have reached a market turning point, while in the former there may be uncertainties as to whether the upside of a high-order interval thrust has been exhausted before the market turning point. As a result, a more stringent condition is required to ascertain the end of the wave in interval  $t$ .

**Aborted falling wave rule I:** When the price line in interval  $t$  rises by three bars before completion of a falling wave, the wave is aborted. When an interval  $t$  wave is aborted, it signals the start of rises generated by the upward market turning point of a higher order interval after completing a downward thrust.

In this statement, it is assumed that the market has fallen by at least eight bars in interval  $t+1$  after starting an interval  $t+1$  or higher order interval thrust. This is required to rule out the case of a pause-up after eight or more falling bars in interval  $t$ .

**Aborted falling wave rule II:** Suppose interval  $t+n$  completes a falling thrust to reach a market turning point, with intervals of size larger than  $t$  and smaller than  $t+n$  all having completed a downward thrust or not having an incomplete downward thrust, interval  $t$  rises by two bars before the completion of a falling wave, then the interval  $t$  falling wave is aborted; a rise induced by the market turning point of interval  $t+n$  has started.

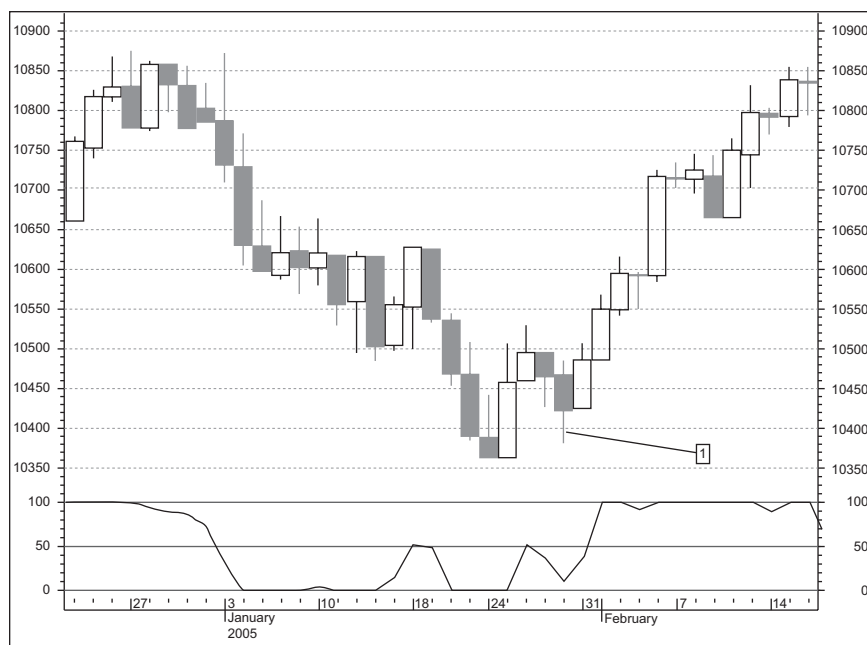
The following rule of aborted waves summarizes in more succinct terms the implication of the last four aborted wave rules.

**Rule of aborted waves:** When an interval  $t$  rising wave is aborted, it signals the completion of a higher order thrust to reach a market turning point. When an interval  $t$  falling wave is aborted, it signals the completion of a higher order interval thrust to reach an upward turning point.



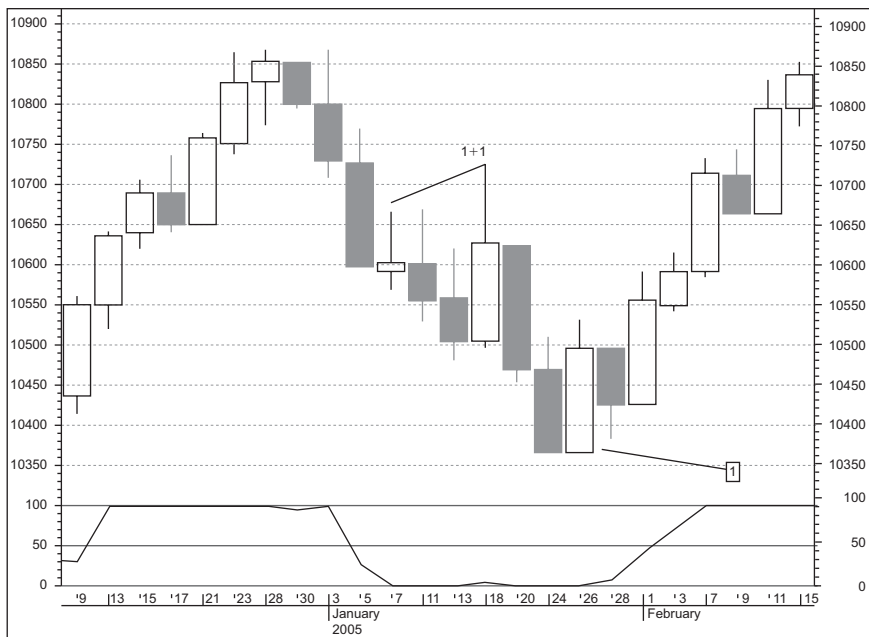
The above rule can be used in three ways. First, it can be used to forecast the incomplete waves in interval  $t$  when a higher order interval thrust is completed. Second, it can be used to decide the exact timing of a countertrend movement when a high-order time frame rises to turning points. Because of the strong upside momentum when the overall upside has not yet finished, it is difficult to determine the exact timing of a fall associated with the pausing point of a high-order interval. In this case, an aborted wave in a lower order interval can help to signal the start of the pause at the turning point of the high-order interval. Third, the rule can be used to forecast the duration of the counter-movement. Once it is known which interval is associated with the fall, the duration of the fall can be largely determined. This point will be further discussed later.

Figures 5.11 and 5.12 demonstrate a case of rebound with incomplete falling waves in the daily interval as a result of the wave being completed in the two-day interval. The charts are drawn with data from the Dow Jones Industrial Average.



**Figure 5.11** Incomplete wave in the daily interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 5.12** Complete wave in the two-day interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

Figure 5.11 shows the daily interval chart, where the market rebounds at point 1, before the completion of the falling wave of four bars. The two-bar fall at point 1 in the daily chart of figure 5.11 completes the falling wave of the two-day interval after the 1+1 pausing-up in the two-day chart in figure 5.12. Therefore, the market rebounds before completion of the falling wave in the one-day interval chart.

Figure 5.12 displays the two-day interval chart. At point 1, the wave after the 1+1 pause-up is completed.

If the market has reached the completion of a downward trend and bottoms up, then the incomplete falling wave may be aborted when the rebound starts. Additionally, at the point where a high-order interval thrust comes to completion, the market will pause up before the completion of a lower order wave if a support level is reached.

In general, a higher order interval dominates a lower order interval in driving the broad market direction and the timing of market turns. But the lower order interval conditions cannot be completely ignored

without necessary qualifications. One of the important regularities at a turning point when a high-order time frame completes its thrust is the following two 2-of-3 rules, which differ slightly between two cases: a temporary pausing towards the other direction or a permanent reversal of the trend.

**2-of-3 rule I—temporary pauses:** On reaching the last bar of an interval  $t$  thrust, two of the three conditions are necessary and sufficient before the start of the temporary pause towards the other direction:

1. Interval  $t$  completing the last bar of the thrust.
2. Lower interval completing an ongoing thrust.
3. A resistance/support level being reached.

**2-of-3 rule II—trend reversals:** On reaching the second last bar of an interval  $t$  thrust, two of the three conditions are necessary and sufficient before the reversal of the trend towards the other direction:

1. Interval  $t$  completing the second last bar of the thrust.
2. Lower order interval completing an ongoing thrust.
3. Interval  $t$  reaching a resistance/support level.

## 5.6 TYPE I, II, AND III PAUSES

It is apparent from a casual inspection of a stock market chart that the market does not move in straight lines. A rising trend is generally accompanied by many temporary downward pauses; a falling trend is generally accompanied by many temporary upward pauses. This is a simple yet fundamental observation of the stock market that has been the focus of much of the discussion in this chapter. Equally important but much less obvious from a casual inspection of the charts is the fact that the strength of a countertrend movement may contain important information about the nature of the running trend. The strength of a countertrend movement can help to reveal whether it is a permanent reversal of the original trend or just a temporary pause against an unfinished trend. The strength of the countertrend movement is to be measured by the relative duration and depth of the pauses against the countertrend as compared with the countertrend itself.

An upward countertrend is more likely to be weak when there is only limited upside space, or when the overall market decline has not yet completed. In this case, the downward pauses on the way up along the upward countertrend are likely to be large and to last a relatively longer

period of time. Between the duration of the downward pause and the depth of the downward pause, the duration of the downward pause is a more robust signal of the upside potential or the lack thereof.

It should be stressed, however, that the absolute duration of the downward pause by itself is not enough to tell much about whether the rise is likely to last; it is the duration of downward pauses relative to the upward distance already traveled on the upward counter-movement that should be examined. Dependent on the duration of a pause-down relative to the duration of the rise before the fall, the pause-down can be classified into three categories.

**Type I pause-down:** While rising on an interval  $t$  or higher order interval thrust, the market pauses down briefly before rebounding. If one of the following three conditions is met, it is called a type I pause-down.

1. After rising eight bars or quasi-eight bars in interval  $t$ , the market pauses down by two bars before rebounding to a new high against the high reached before the pause-down.
2. After rising for four bars but less than eight bars, quasi-eight bars and virtual eight bars in interval  $t$ , the market falls by one bar before rebounding to a new high against the high reached before the pause-down.
3. After rising from stochastics-A to stochastics-B in interval  $t$  with less than eight up-bars, quasi-eight bars or virtual eight bars, the market falls by one bar before rebounding to a new high against the high reached before the pause-down.

The appropriate interval used in counting the falling bars should be the highest interval that has risen from stochastics-A to stochastics-B.

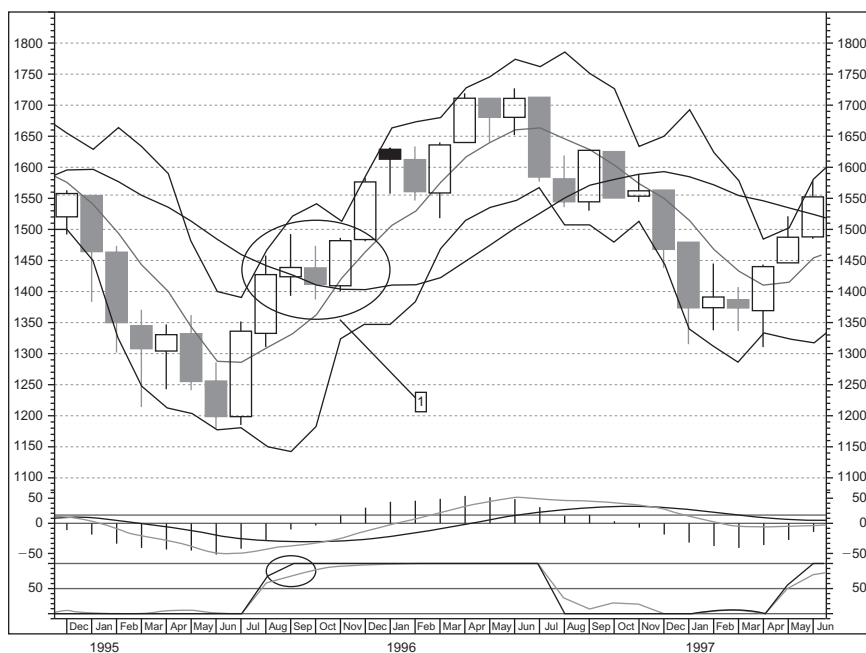
**Type II pause-down:** While rising on an interval  $t$  or higher order interval thrust, the market pauses down briefly before rebounding. If one of the following three conditions is met, it is called a type II pause-down.

1. After rising eight bars or quasi-eight bars, the market pauses down by three or four bars before rebounding to a new high.
2. After rising for four bars or more but less than eight bars, quasi-eight bars or virtual eight bars, the market falls by two bars before rebounding to a new high.
3. After rising from stochastics-A to stochastics-B but rising by less than eight bars, quasi-eight bars or virtual eight bars, the market falls by two bars before rebounding to a new high.

The appropriate interval used in counting the falling bars should be the highest interval that has risen from stochastics-A to stochastics-B.

**Type III pause-down:** While rising on an interval  $t$  or higher order interval thrust, the market pauses down briefly before rebounding. If one of the following three conditions is met, it is called a type III pause-down.

1. After rising eight bars or quasi-eight bars, the market pauses down by five or six bars before rebounding.
2. After rising for four bars or more but less than eight bars or quasi-eight bars, the market falls by three bars before rebounding.
3. After rising from stochastics-A to stochastics-B but rising by less than eight bars, quasi-eight bars or virtual eight bars, the market falls by three bars before rebounding.



**Figure 5.13** Type I pause-down

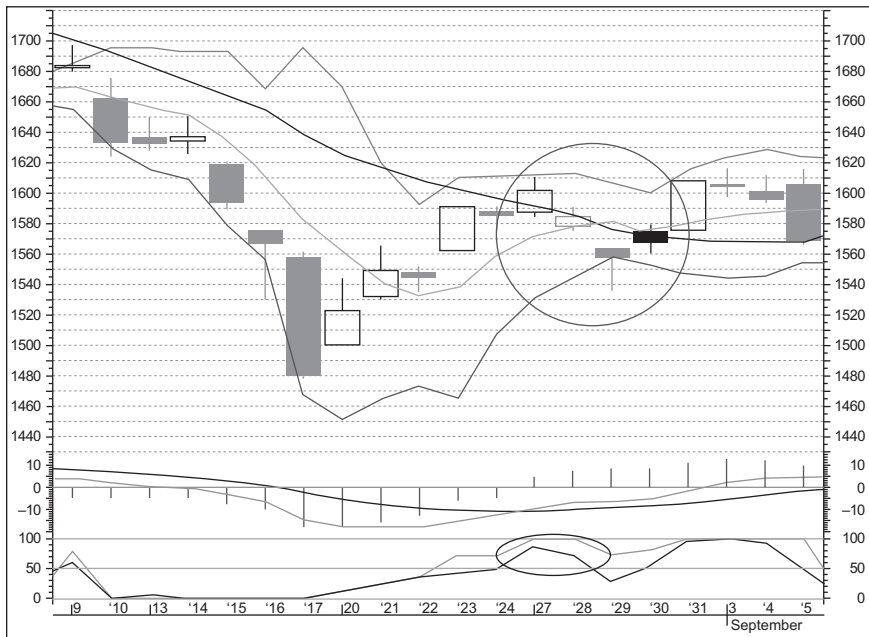
Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

Here the appropriate interval used in counting the falling bars should be the highest interval that has risen from stochastics-A to stochastics-B.

In the above definitions for type I, II, III pause-downs, rising for seven bars is considered the same as rising for eight bars if a resistance level is reached. Otherwise, it is considered the same as rising for 4-6 bars. Falling by hidden k bars in the pause-downs is considered the same as falling by regular, visible k bars. Additionally, stochastics-A and stochastics-B can be substituted with ghost-A and ghost-B, respectively.

Figure 5.13 displays an example of a type I pause-down at point 1. The market falls by one bar after reaching ghost-B in the interval chart. The chart is drawn with monthly data from Topix.

Figure 5.14 displays an example of a type II pause-down. The market falls by two bars after rising by six bars in the displayed interval. The chart is drawn with daily data from Topix.



**Figure 5.14** Type II pause-down

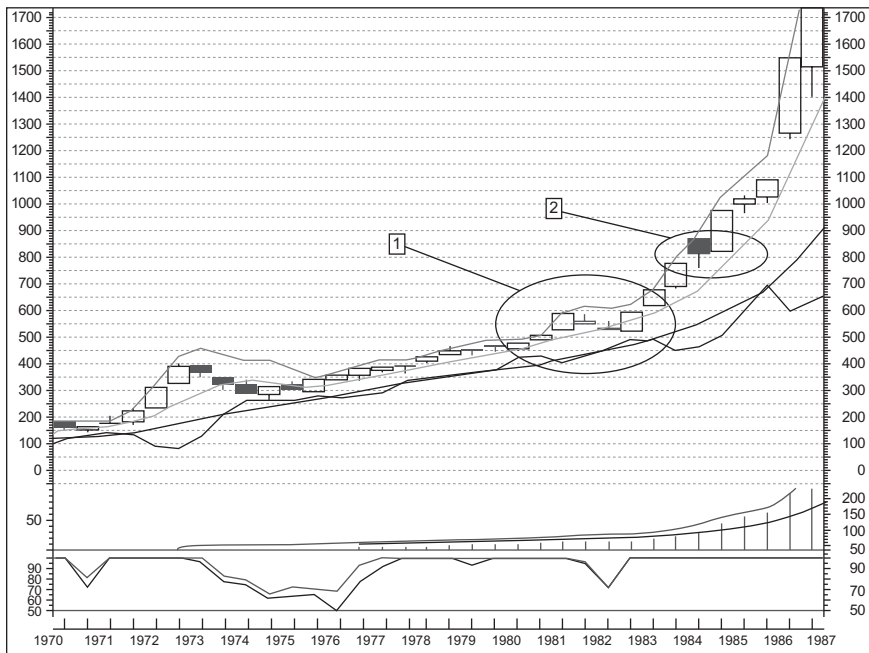
Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

Figures 5.15 and 5.16 show an example of a type I pause-down after a rebound from a pause-down in a higher order interval, the half-year interval, without reaching stochastics-A in the considered interval, the quarterly interval. After two downward pausing bars in a half-year interval at point 1, the market rebounds to a new high. At point 2, the market rises for six bars on the quarterly interval chart, pausing-down by one bar, then rebounds to a new high. The pause-down at point 2 is a type I pause-down. The charts are drawn with data from Topix.

Figure 5.15 shows the half-year interval chart, which displays a two-bar pause-down at point 1.

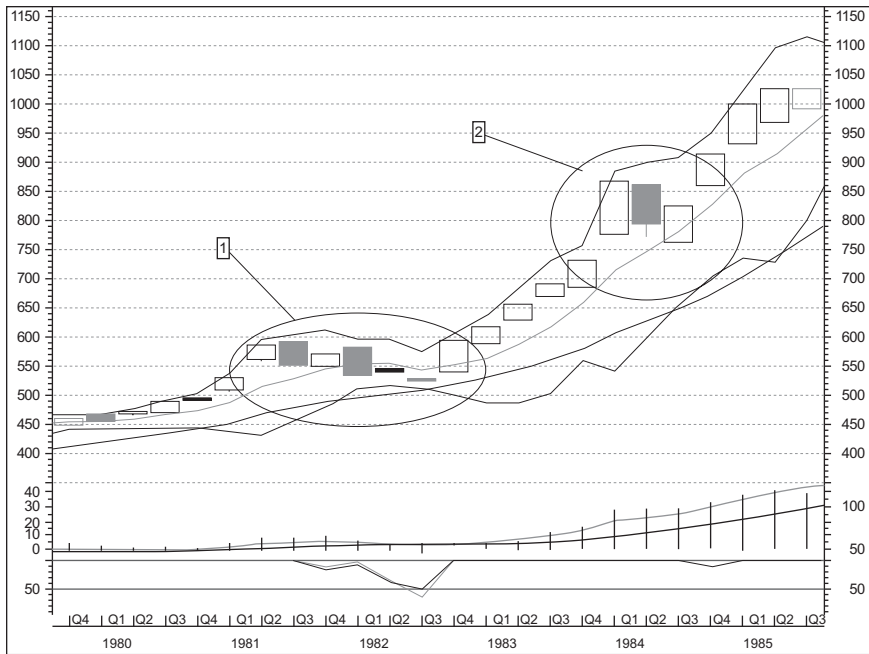
Figure 5.16 shows the quarterly interval chart, which displays a one-bar type I pause-down at point 2 after rising for six bars from point 1.

Notice that in the above definitions, condition 3 differs from condition 1 and 2 in that a different time interval may be used for counting the downward pausing bars. Suppose for condition 1 and condition 2, interval  $t$  is used. In condition 3, the market reaches stochastics-B for interval  $t$  and  $t+n$  at the same time, where  $n > 0$  and  $t+n$  is the highest



**Figure 5.15** Half-year interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 5.16** Quarterly interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

interval reaching stochastics-B after rising from stochastics-A, then condition 3 should be applied to interval  $t+n$ . In this case, lower order stochastics-B are no longer an appropriate reference to be compared with the duration of any pause-down. Instead, either the number of rising bars or the highest order stochastics-B should be used as a reference.

One complication in categorizing different pause-downs appears when the decline comes in the form of 1+1, or hidden 1+1 instead of a straight two-bar decline for a type II pause-down after a four- to six-bar rise. For easy reference, this is called a composite type II pause-down, or a type IIc pause-down. Similarly, a composite type I pause-down, or a type Ic pause-down can be defined.

**Type IIc pause-down:** While rising on an interval  $t$  or higher order interval thrust, the market pauses down briefly before rebounding. If one of the following three conditions is met, it is called a type IIc pause-down.



1. After rising eight bars or quasi-eight bars, the market pauses down by 2+2 bars or hidden 2+2 bars before rebounding to a new high.
2. After rising for four bars or more but less than eight bars or quasi-eight bars, the market falls by 1+1 bars, or hidden 1+1 bars before rebounding to a new high.
3. After rising from stochastics-A to stochastics-B but rising by less than eight bars, quasi-eight or virtual eight bars, the market falls by 1+1 bars or hidden 1+1 bars before rebounding.

Here the appropriate interval used in counting the falling bars should be the highest interval that has risen from stochastics-A to stochastics-B.

**Type Ic pause-down:** If in place of the two-bar decline in a type I pause-down a 1+1 decline or hidden 1+1 decline is observed, the pause-down is called a composite type I pause-down, or type Ic pause-down.

If interval *t* and a higher order interval arrive at their pausing points at the same time, the above definition should not be applied to the interval *t* chart in classifying the ensuing pause-down. Instead, the classification should be done using the higher order interval.

When the market pauses up on decline, the pause-ups can also be clarified into three different categories.

**Type I pause-up:** While falling on an interval *t* or higher order interval thrust, the market pauses up briefly before topping-off. If one of the following three conditions is met, it is called a type I pause-up.

1. After falling by eight bars or quasi-eight bars in interval *t*, the market pauses up by one or two bars before falling to a new low.
2. After falling for four bars in interval *t*, the market rises by one bar in the interval before falling to a new low.
3. After falling from stochastics-B to stochastics-A in interval *t*, the market rises by one bar before falling to a new low.

Here the appropriate interval used in counting the rising bars should be the highest interval that has fallen from stochastics-B to stochastics-A.

**Type II pause-up:** While falling on an interval *t* or higher order interval thrust, the market pauses up briefly before topping-off. If one of the following three conditions is met, it is called a type II pause-up.

1. After falling by eight bars or quasi-eight bars in interval *t*, the market pauses up by three or four bars before falling to a new low.
2. After falling for four bars or more but less than eight bars or quasi-eight bars in interval *t*, the market rises by two bars in interval *t* before falling to a new low.
3. After falling from stochastics-B to stochastics-A in interval *t* and before falling for eight bars, quasi-eight bars or virtual eight bars down, the market rises by two bars before falling to a new low.

Here, the appropriate interval used in counting the rising bars should be the highest interval that has fallen from stochastics-B to stochastics-A.

**Type III pause-up:** While falling on an interval *t* or higher order interval thrust, the market pauses up briefly before topping-off. If one of the following three conditions is met, it is called a type III pause-up.

1. After falling by eight bars or quasi-eight bars in interval *t* from interval *t* or higher order stochastics-B, the market pauses up by five or six bars before falling to a new low.
2. After falling for four bars or more but less than eight bars or quasi-eight bars in interval *t*, the market rises by three bars in interval *t* before falling to a new low.
3. After falling from stochastics-B to stochastics-A in interval *t* and before falling for eight bars, quasi-eight bars or virtual eight bars down, the market rises by three bars before falling to a new low.

Here, the appropriate interval used in counting the rising bars should be the highest interval that has fallen from stochastics-B to stochastics-A.

**Type IIc pause-up:** While falling on an interval *t* or higher order interval thrust, the market pauses up briefly before topping-off. If one of the following three conditions is met, it is called a type IIc pause-up.

1. After falling by eight bars or quasi-eight bars in interval *t*, the market pauses up by 2+2 bars or hidden 2+2 bars before falling to a new low.
2. After falling for four bars or more but less than eight bars or quasi-eight bars in interval *t*, the market rises by 1+1 bars or hidden 1+1 bars in interval *t* before falling to a new low.
3. After falling from interval *t* or higher order interval stochastics-B to interval *t* stochastics-A and before falling for eight

bars or quasi-eight bars down, the market rises by 1+1 bars or hidden 1+1 bars before falling to a new low.

Here, the appropriate interval used in counting the rising bars should be the highest interval that has fallen from stochastics-B to stochastics-A.

**Type Ic pause-up:** If in place of the two-bar rise in a type I pause-up, a 1+1 or hidden 1+1 rise is observed, the pause-up is called a composite type I pause-up, or a type Ic pause-up.

In the above definitions, falling for seven bars is considered the same as falling for eight bars if a support level is reached. Otherwise, it is considered the same as falling for four to six bars. Rising by hidden  $k$  bars in the pause-ups is considered the same as rising by regular, visible  $k$  bars. The hidden  $k$  bar conditions are explicitly noted in the definition of the composite pauses, where they are most likely to be observed. Additionally, stochastics-A and stochastics-B can be substituted with ghost-A and ghost-B, respectively.

Before leaving the discussion of the three types of pauses, two exceptions to the above definition should be pointed out.

**Exception to type II pause-down:** If the market rises for six bars on the interval  $t$  chart to reach stochastics-B and the interval  $t+1$  Bollinger upper band+1 or Bollinger upper band+2, but the MACD histogram on the interval  $t$  chart is negative, a two-bar pausing-down in the interval  $t$  chart is a type I pause-down instead of a type II pause-down.

**Exception to type II pause-up:** If the market falls for six bars on the interval  $t$  chart to reach stochastics-A and the interval  $t+1$  Bollinger lower band+1 or Bollinger lower band+2, but the MACD histogram on the interval  $t$  chart is positive, a two-bar pausing-up in the interval  $t$  chart is a type I pause-up.

For later analysis, it is useful to note that with interval  $t$  in the balanced market and  $t+1$  in the bear market, a type II pause-up corresponds to rebounding to an interval  $t-1$  balanced market; a type I pause-up corresponds to rebounding to an interval  $t-2$  balanced market. Similar correspondence can be observed about type I pause-downs and type II pause-downs.

## NOTE

1. Bollinger Band is named after its author John Bollinger, CFA, CMT, [www.BollingerBands.com](http://www.BollingerBands.com)



## Trend Reversals vs. Temporary Countertrends

After the introduction of the basic elements of the Full View analytic system in the previous chapters, it is time to answer the most important question facing market participants: how to identify the reversal of a trend. In a declining stock market, when can we be sure that a rebound is a bottoming-up rebound? Or alternatively, in a rising market, when a fall is the topping-off, whether there is further downside to go? Additionally, it is also important to discover signals for a temporary countertrend movement. In a falling market, what flags a temporary rebound, with more decline to follow? In a rising market, what flags a temporary fall, with further rises ahead?

In motivating a different approach from the existing technical analysis, it is noted at the beginning of the book that the reversal of a longer trend takes a longer countertrend to confirm. The next section will make it clear how long this countertrend needs to be in order to confirm the reversal of the original trend.

### 6.1 TREND REVERSALS

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In answering the question of whether the market has bottomed out from a falling trend, or whether the market has topped off from a rising trend, the concept of an interval-specific bull and bear market is very useful. The associated bear market cap and bull market floor are the keys to answer the above questions.

When time interval  $t$  is in the bear market and the overall decline has not been completed, any temporary rebound will not exceed the bear market caps that are specified in eight different conditions with

slight variations from each other. Six of the conditions are provided in chapter 4, section 3 and two provided in chapter 5, section 2. Similarly, when time interval  $t$  is in the bull market and the overall rise has not yet been completed, a temporary fall is not expected to last for more than the bull market floors.

Given the bear market caps and bull market floors, it is natural to ask the following question: If the market rebounds to reach the bear market cap with time interval  $t$  in the bear market, then pauses down briefly before further rebounding to reach a new high, what can be said about the overall trend of the market? The answer is obvious—that the market must have completed the overall decline and bottomed out. The rebound is a permanent change of direction, rather than a temporary pause-up. Otherwise, the market would have continued the fall after topping-off from the bear market cap. To confirm the bottom-up, the pause-down is required to be at least for two bars in interval  $t-2$ ; this is to make sure that the further movements towards the upside are not a continuation of the earlier rise, but another wave up in interval  $t-2$ . As a result, the break of the interval  $t$  bear market cap after a two-bar pause-down in interval  $t-2$  at the cap confirms the trend reversal towards the upside.

To understand the underlying principle for confirming a bottom-up rebound, note that after the pause-down at the cap and the rebound to a new high, interval  $t$  turns from the bear market into the bull market. In general, the time interval in the bear market turning into the bull market is what is needed to confirm the trend reversal. The following bottoming-up rule can be stated (conditions 4 and 5 to be explained shortly).

**Bottoming-up rule:** Suppose the market is on a falling trend with interval  $t$  in the bear market. If the market rebounds to satisfy one of the following conditions, it has bottomed out.

1. After rebounding to eight up-bars in interval  $t-2$ , quasi-eight up-bars, or virtual eight up-bars, the market falls by two or more bars in interval  $t-2$  without turning interval  $t-1$  into the bear market, then rises to a new high.
2. The market rebounds to four up-bars in interval  $t$  with the following two conditions satisfied:
  - i. The fourth bar is a rising bar that closes above the open;
  - ii. The fourth bar closes above the highest high of the first three bars.
3. The market rebounds to close at a new high compared with the high reached before falling to the interval  $t$  bear market.

4. The market rebounds to indicate at least a type II pause-up without reaching any Bollinger lower band+1 or support level.
5. The market rebounds to indicate at least a type III pause-up without reaching any Bollinger lower band+2 or support level.

According to conditions 1 and 2, if the market rebounds from a decline with interval  $t$  in the bear market, when the rebound turns interval  $t$  into the bull market, then the fall has ended and the rebound is a bottom-up rebound. Condition 3 works for the same reason that interval  $t$  is turned into the bull market; it is related to the bull market condition 6 specified in Chapter 4, section 4.2. Condition 3 here is a special case of the condition in Chapter 4, which requires the rebound rising above the last two falling bars in interval  $t+1$ .

It is worth noting that not all the six conditions mentioned in Chapter 4 as the criteria for judging bull and bear markets are listed here. This is because some of the six conditions require the considered interval to start from the balanced market rather than the bear market. Specifically, the MACD histogram turning from negative to positive, the price line turning from below the MA-14 line to above the MA-14 line, and the price line rising to pass the halfway level between the high and the low in the fall cannot be used as the signal of interval  $t$  moving from the bear market into the bull market. The MACD histogram and MA-14 line are robust trend indicators only if starting from the balanced market.

Conditions 4 and 5 are newly introduced here and not listed in Chapter 4. These two conditions come from the observed regularities in the close relationship between the duration of a temporary rebound and the strength of support at the rebounding point. If the rise lasts more than what can be expected normally on a temporary rebound, then it can be judged to be a bottom-up rebound. This inference is the rationale behind conditions 4 and 5. It is not always robust, but works most of the time.

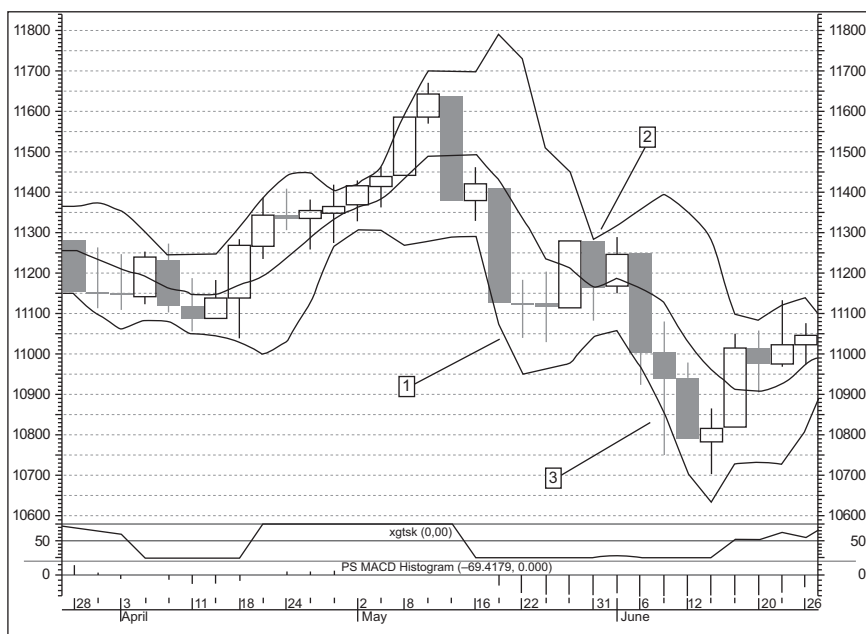
In general, when the market is on a decline, only one of the FVITA time intervals is in the bear market with lower order intervals in the balanced market and higher order intervals in the bull market. In this case, it is straightforward to apply the above bottoming-up rule. Occasionally, two time intervals may be in the bear market at the same time. In this latter case, if condition 1 or condition 2 is satisfied for one of the two intervals, then the rule can be applied and the market has bottomed up. The other three conditions are not related to which interval is in the bear market, and can be applied without complications.

Obviously, in order to apply condition 1 and condition 2 as quickly as possible to obtain early signals on a bottoming-up rebound, the lower order interval of the two should be used in applying the above rule.

Figure 6.1 and Figure 6.2 provide an example of two time intervals being in the bear market at the same time. At point 1 in figure 6.2, the one-week interval reaches ghost-A, i.e., the two-day interval reaches virtual eight bars down. At point 2, the two-day interval pauses up for three bars before falling to a new low at point 3. As a result, the two-week interval turns into the bear market. At the same time, the one-week interval declines by six bars, still in the bear market. The charts are drawn on data from the Dow Jones Industrial Average.

Figure 6.1 displays the two-day interval chart. After rebounding from virtual eight bars at point 1 to point 2, the market falls to a new low, signaling the bear market for the two-week interval at point 3.

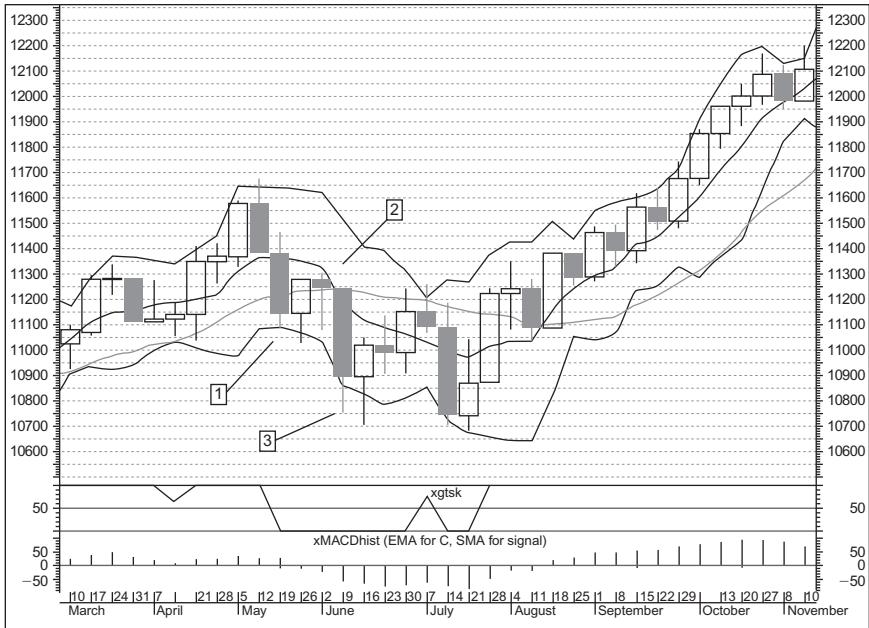
Figure 6.2 displays the weekly interval chart, which reaches ghost-A at point 1. This sends the two-day interval down by virtual eight bars. At point 3, the weekly interval is in the bear market after falling by six bars.



**Figure 6.1** Two-day interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock





**Figure 6.2** Weekly interval chart in the bear market

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

Similar to the above bottoming-up rule, the following topping-off rule applies when one of the five specified conditions is satisfied on a rising trend.

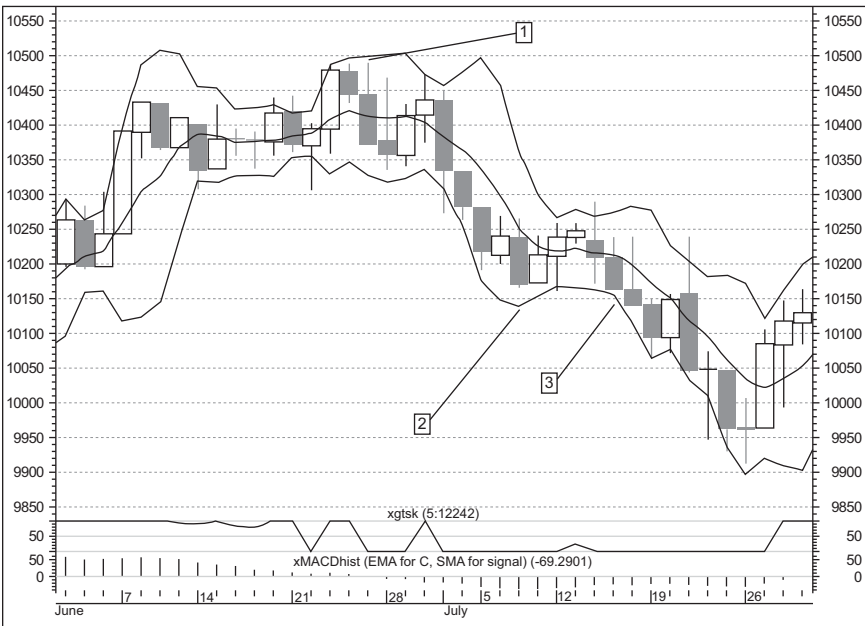
**Topping-off rule:** Suppose interval  $t$  is in the bull market on a rising trend. If the market falls to satisfy one of the following conditions, it has topped off.

1. After falling by eight bars, quasi-eight bars, or virtual eight bars in interval  $t-2$ , the market rises by two or more bars in the interval without turning interval  $t-1$  into the bull market, and then falls to a new low.
2. The market falls by four bars in interval  $t$  with the following two conditions satisfied:
  - i. The fourth bar is a falling bar that closes below the open;
  - ii. The fourth bar closes below the lowest low of the first three bars.

3. The market falls to a new low.
4. The market falls to indicate at least a type II pause-down without reaching any Bollinger upper band+1 or resistance level.
5. The market falls to indicate at least a type III pause-down without reaching any Bollinger upper band+2 or resistance level.

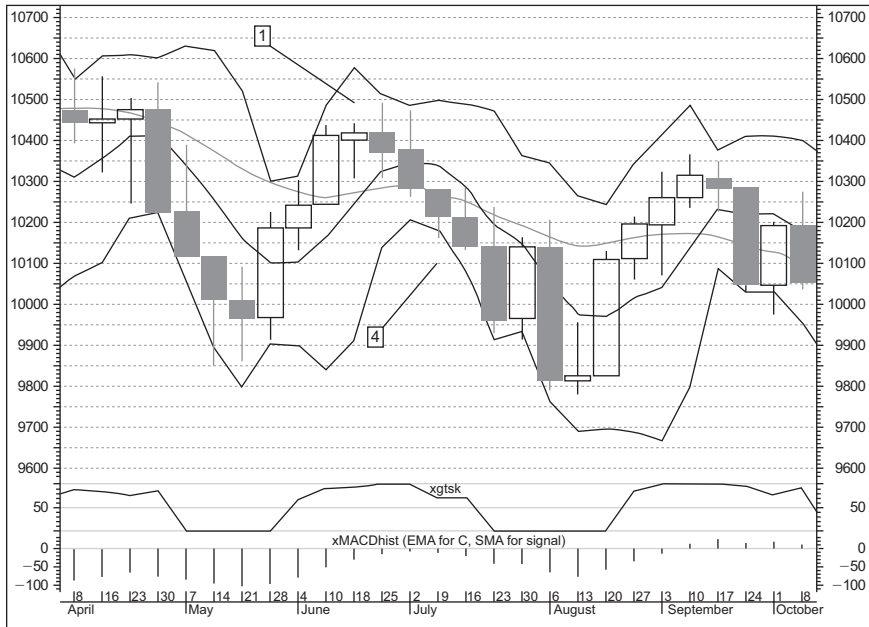
In the following figures 6.3 and 6.4, the one-week interval is in the bull market at point 1. On falling to point 2, the one-day interval chart falls by more than eight bars. After pausing-up by two bars, the market falls to a new low, signaling the end of the rise and the topping-off. Alternatively, the topping-off can be confirmed by looking at point 4, where the one-week interval falls by four bars, satisfying condition 2 of the topping off rule. The charts are drawn with data from the Dow Jones Industrial Average.

Figure 6.3 shows the daily interval chart, which falls by more than eight bars at point 2. After rebounding by two bars from point 2, the market falls to a new low, sending the weekly chart into the bear market.



**Figure 6.3** Daily interval chart signals weekly interval into the bear market  
Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

Figure 6.4 displays the weekly interval, which reaches the bear market at point 3 after falling by four bars. The bear market is also confirmed by signals from the daily interval chart.



**Figure 6.4** Weekly interval falling to bear market

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

Normally, condition 1 is a faster way of confirming the topping-off. But sometimes, there is no pausing-up after the market falls by eight bars in time interval  $t-2$ . In this latter case, condition 2 may still provide us a way to confirm the topping-off.

In searching for the signals to confirm a trend reversal, it is desirable to obtain the signals as early as possible. Waiting for market signals can generate lots of anxiety when the market makes large movements against the original trend before the market reversal signals emerge. In this case, significant opportunities for profit may be missed while waiting for the signals. However, this is the cost to pay for making sure that the actions taken are based on robust signals. Without further qualification, the conditions stated above are the tightest possible conditions to be specified.

To be more specific, look at the case of a rebound. Frequently, under the five conditions, a bottom-up rebound may only be confirmed after the rebound has recovered most or all of the lost ground from the market decline, but the condition cannot be made more stringent as a general rule. This is because on an incomplete falling trend, there are frequent type II pause-ups on the way down before the final bottoming-up rebound. The bear market caps are often reached on pause-ups before further falls. The conditions specified above, therefore, are the efficient conditions—the most stringent conditions possible without restricting the consideration to specific circumstances.

However, earlier signals may be obtained if the attention is restricted to special circumstances. In fact, conditions 4 and 5 are introduced as an effort to obtain earlier signals relative to conditions 1 to 3. More can be done in this direction for early decisions on the bottoming-up rebound by anticipating the rebound before the market turns up. This will be discussed later.

## 6.2 WITHOUT THE TWO-DAY CHART

For the readers that have access only to the daily interval chart, weekly interval chart and monthly interval chart, but not the two-day interval chart, two-week interval chart and quarterly interval chart, analyses can be done by using the daily interval chart to infer the movements in terms of the two-day interval chart; similarly, the weekly chart can be used to infer movements in the two-week chart and the monthly interval chart for the quarterly interval chart.

For example, suppose the task is to judge whether the two-day interval has fallen into the bear market but without the access to the two-day interval chart. The daily interval chart can be used. When the daily interval falls by eight to twelve bars, the two-day interval falls by four to six bars into the bear market. Similarly, in trying to judge whether the two-week interval has fallen into the bear market, the weekly interval chart may be inspected to see if it has fallen by eight to twelve bars, which is equivalent to the two-week interval falling by four to six bars into the bear market.

Alternatively, suppose the task is to evaluate the situation where the two-day interval falls by eight bars, rebounding and then falling to a new low as the way to confirm the two-week interval being turned into the bear market. Without access to the two-day interval chart, the daily interval may be used as the substitute. The two-day interval falling by eight bars is equivalent to the daily interval falling by 15 to 17 bars.

The two-day interval rising by two bars is equivalent to the daily interval rising by three to five bars. Thus, if in the daily interval the market falls by 15 to 17 bars, followed by three to five rising bars, before declining again to a new low, then the two-week interval has fallen into the bear market.

### 6.3 RUNNING SPACE AFTER TREND REVERSAL

Most times, after the bottoming-up, the rebound will reach a new high and rise to complete another wave or finish a higher order thrust to the next market turning point. This happens when the fall was started after the completion of a rising thrust to reach an expected downward pausing point. In this case, after the bottoming-up, the market will continue the rise until reaching the next market turning point.

But it is possible, and frequently does happen, that the market becomes jittery towards a pausing point and falls before reaching the downward market turning point. In this case, after the bottoming-up rebound from the fall, a further fall is expected on reaching the expected downward pausing point, either after reaching a new high or just before reaching a new high. The subsequent fall will start the expected pause-down. Having fully reached the current pausing-down point before the fall, the ensuing rebound, after being confirmed as the bottoming-up rebound, can then be expected to last for another rising wave, or to reach the next higher order downward pausing point.

There are times when the combined falls from the decline before reaching the pausing point and the one after reaching the pausing point together complete the expected downward pause. For example, suppose the expected downward pause at a pausing point is by two bars in interval  $t$ , or four bars in interval  $t-1$ . The market may fall by two bars in interval  $t$  before reaching the pausing point, rebound to the pausing point, then fall again by another two bars to complete the expected four-bar pausing-down in interval  $t$  before bottoming-up and rising to a new high towards the next downward pausing point.

In general, there are two conditions to check whether a new up-thrust has started after the bottoming-up rebound:

1. Whether the market has reached the pausing point before the fall;
2. Whether the anticipated pausing-down has been completed before the market rebound.

If the fall started after reaching the expected downward pausing point, and the expected temporary decline has been completed, then the market is expected to rise to complete another upward wave or complete the higher order upward thrust to reach the next pausing point.

To correctly use the above two conditions, it is important to know the exact market turning point and the expected duration of the pause-down. This will be discussed in the next chapter.

Similarly, in judging whether the market will start another falling wave after topping-off from a temporary uptrend, there are also two conditions to check. The rule applies, however, only when the market tops off before reaching a historical new high. This is because the economy will continue to grow; therefore, the stock market will always maintain an overall uptrend. As a result, topping-off is not expected to happen after reaching a historical new high; all the falls, in this case, are temporary pause-downs only.

To check on whether a new downward wave is expected after topping-off before reaching a historical new high, the two conditions are:

1. Whether the market has reached a pausing point before the temporary uptrend;
2. Whether the expected pausing-up has been completed before the topping-off.

If the market has reached a market turning point before the upward pause, and completed the upward pause before topping-off, then after topping-off, it is expected to reach a new low and complete another downward wave, or a higher order falling thrust.

The above two conditions are based on the nature of a high-order interval pausing point that generates the temporary pause-up. Additionally, there are two low-order time interval indicators that can be used to judge whether the fall after the topping-off will reach a new low.

1. Suppose the market rises for two bars in interval  $t$  before the topping-off, setting up another downward wave in the interval after the topping-off. If the fall is slow and the next wave in interval  $t$  or the running thrust of a higher order time interval  $t$  is completed before reaching a new low, then the risk is high that the market will rebound before reaching a new low.
2. If there are type II and type III pausing-ups after the topping-off, then there will be at least a temporary pausing-up after

completing another downward wave in interval *t* or completing the thrust of a higher order time interval.

When condition 1 and 2 mentioned above are satisfied at the same time, a rebound is almost certain, although whether the rebound is just a temporary pausing-up or a bottoming-up rebound still needs to be judged together with higher order conditions. It may be difficult to make a clear judgment about the nature of the turning point in the high-order interval chart. In this case, the best option is to wait for firm signals, taking a long position if the rebound turns the bear market interval into the bull market, or taking a short position after the rebound fails.

Similarly, suppose the market declines in the bull market, and falls by two bars in interval *t* before bottoming-up. After the bottoming-up rebound, if one of the following two conditions is satisfied, then the market is almost certain to fall at least temporarily after completing the upside wave in interval *t* or after completing the higher order running thrust:

1. The market completes another upwave in interval *t* or a higher order thrust before reaching a new high.
2. There are type II or type III pausing-downs after the bottoming-up rebound. The duration of the fall needs to be judged along with high-order conditions.

Normally, however, after the topping-off the fall is likely to be sharp. Before the completion of the running down thrust of a high-order time interval, only a type I pause-up is expected on the way down. Similarly, after the bottoming-up, the rise tends to be strong; only a type I pause-down is expected on the way up before approaching the completion of the high-order running thrust.

## **6.4 TEMPORARY COUNTERTRENDS**

Before the completion of a decline for the bottoming-up rebound, there are often numerous temporary pausing-ups. How to distinguish these temporary pausing-ups from the ultimate bottoming-up rebound with a good degree of confidence is one of the motivations for the FVITA approach. It is one of the most important questions in making an investment or trading decision. After introducing the Full View time interval system and the concept of a bounded

bull/bear market, the previous sections have successfully answered half of the question; conditions are spelled out to judge when the rebound on a falling trend can be confirmed to be the bottoming-up rebound, or when a fall can be confirmed to be the topping-off in a rising market.

In fact, the aforementioned results also provide one way to answer the other half of the question: when a bear market rebound can be judged as only temporary or when a fall in a bull market is signaled to be only temporary. Specifically, when a declining market rebounds, the rebound is confirmed to be only temporary after the topping-off is confirmed. Similarly, when a rising market falls, the decline is shown to be only temporary after the bottom-up is confirmed. That is, a trend is shown to be temporary after its reversal is confirmed.

It is preferable, obviously, if the temporary nature of the trend can be determined and the trend reversal can be anticipated before the turning of the market. One way to obtain faster signals for ascertaining a temporary trend in interval  $t$  is to analyze how the trend is generated. Suppose the trend is a result of a higher order interval  $k$  reaching a turning point. If at the turning point, the original trend displayed in interval  $k$  is not yet complete, then the movement in the opposite direction—the interval  $t$  trend—is a temporary pause only. If the original trend has already been completed, then the countermovement should be a permanent trend reversal. However, there are uncertainties involved in using the nature of the high-order interval turning point to make calls on the duration of the countertrend; it is difficult to make a precise and robust forecast in every case.

There is a more robust way to judge whether a countertrend is only temporary. This is based on the observation that on a trend reversal, the new countertrend movement enjoys firm support, with minimum hesitation displayed in the form of countermovements against the new trend. Pauses towards the direction of the old trend tend to be short. Therefore, when the countertrend is accompanied by long pauses on the way, it is signaled to be only temporary; further market action towards the original trend is expected. For this reason, the durations of downward pauses of an uptrend provide an effective way to analyze whether the rebound is temporary. Similarly, the durations of upward pauses against a downward trend provide a good way to judge whether the falling trend is only temporary.

More specifically, type II and type III pauses against a trend provide signals that the trend is only temporary. On the other hand, after trend



reversal, there will normally be at most only type I pauses. In a bear market rebound, for example, if the rebound is the bottom-up rebound after the completion of the expected decline, then the rise will be supported by a sustained buying interest with very brief pull-backs only, not more than type I downward pauses. It is possible that there will be no downward pauses at all before reaching a new high.

**Type I cap and floor after market reversal:** On a bottoming-up rebound, there are at most only type I pause-downs on the way up. After topping-off, there are at most only type I pause-ups on the way down.

On the other hand, if there are type II and type III downward pauses, i.e., after rising for eight bars, or virtual eight bars, or quasi-eight bars, the market falls by three/four or more bars, then the rebound is not expected to last. The rise is only a temporary pausing-up, not the bottoming-up rebound.

**Signals of a pausing-up:** Suppose a falling market rebounds. If there are type II or type III downward pauses on the way up before the bear market interval is turned into the bull market, then the rebound is only a temporary pause-up, not the final bottoming-up rebound.

Normally, if the downward pause is a type II pause on rebound, then after the downward pause and rebound to a new high the market is expected to complete another upwave, or complete a higher order thrust. After the upwave or the running higher order thrust is complete, there will be at least a type II pausing-down, or the topping-off.

Recall that if the rebound is temporary only with time interval  $t$  in the bear market, then the limit for the upside movement is given by the  $t$  interval bear cap, specified in eight different conditions after rising to a  $t-2$  balanced market. However, the rebound may not reach the cap before topping-off. If the decline follows a temporary pause-up with high-order downside incomplete, then after the topping-off, there are only type I pause-ups on the way down before the next market turning-up point. For example, if the market rebounds on the way down with interval  $t$  in the bear market, then the cap for the rise, a type I pause-up, will be the balanced market in interval  $t-3$ , given by the eight different conditions. The market will not rise to the balanced market in interval  $t-2$  before topping-off. The following topping-off rule summarizes the two different cases.

**Topping-off on a pause-up:** If interval  $t+1$  is in the bear market and only a type I pause-up is expected, or if interval  $t$  is in the bear market

with the countertrend rise displaying a type II pause-down, then the highest point to reach before the market topping-off is given by one of the following conditions:

1. Interval  $t-2$  chart rises for eight bars, quasi-eight bars or virtual eight bars, reaching stochastics-B or ghost-B; the MACD histogram of the interval is negative.
2. Interval  $t-2$  chart rises for eight bars, quasi-eight bars or virtual eight bars, reaching stochastics-B or ghost B; the price line of the interval remains below the MA-14 line.
3. Interval  $t-1$  chart rises by four bars, reaching stochastics-B or ghost-B; the MACD histogram of the interval is negative.
4. Interval  $t-1$  chart rises by four bars, reaching stochastics-B or ghost-B; the price line of the interval remains below the MA-14 line.
5. Interval  $t-2$  chart rises for eight bars or more, quasi-eight bars or virtual eight bars, reaching stochastics-B or ghost B. Three rising waves are completed in interval  $t-3$  or interval  $t-2$ .
6. In the interval  $t-2$  chart, market price rises to stochastics-B and breaks the MA-14 line from below; the MACD histogram turns positive. Interval  $t$  chart rises by R9 up-bars.
7. After rising by eight bars, quasi-eight bars or virtual eight bars in interval  $t-2$ , the market reaches interval  $t-1$  or the  $t-2$  Bollinger upper band +2.
8. After rising to interval  $t-1$  stochastics-B, the market reaches the interval  $t$  Bollinger upper band +2.

There is one exception that should be pointed out. After type II pause-downs with interval  $t$  in the bear market, the market most times will not rise for more than six bars in time interval  $t-2$  after reaching stochastics-B if the MACD histogram is in the negative.

**The six-bar rule in temporary pausing-ups:** Suppose the market rebounds temporarily with time interval  $t$  in the bear market. After type II pausing-downs on the way up, the market is expected to top off if it rises for six bars in time interval  $t-2$  with the MACD histogram still in the negative.

Similar to the situation in the bear market rebound, when the market falls in the bull market before reaching a historical new high, there is the following rule for the maximum downside.

**Signal of a pause-down:** Suppose a rising market declines before reaching a historical new high. If there are type II or type III upward pause-ups on the way down before the bull market interval  $t$  is turned

into the bear market, then the fall is only a temporary pausing-down, not the final topping-off.

It is worth noting the extra condition specified here that the above rule should be used when the stock market has not reached a historical new high. Otherwise, the fall would almost always be a temporary pausing-down in the sense that it will not turn the bull market interval into the bear market. This is due to the overall positive trend in the stock market.

Normally after a type II pausing-up, if the market falls to a new low, it is expected to complete another wave down unless the expected decline is completed or a higher order falling thrust is finished. After completing another wave or the running thrust, the market is expected to make at least another type II pause-up.

**Implication of a type II pause:** On resumption of the original trend after a type II countertrend pause, the market is expected to make at least another countertrend type II pause after the completion of the running thrust or the next wave.

When the downward trend is signaled to be temporary, the bottom-up rebound is expected once one of the eight conditions is satisfied, as summarized below.

**Bottoming-out on a pause-down:** If interval  $t+1$  is in the bull market and only a type I pause-down is expected, or if interval  $t$  is in the bull market with the countertrend rise having displayed type II pause-downs, then the lowest point to reach before the market bottoms out is given by one of the following conditions:

1. Interval  $t-2$  chart falls for eight bars, quasi-eight bars or virtual eight bars, reaching stochastics-A or ghost-A; the MACD histogram of the interval is positive.
2. Interval  $t-2$  chart falls for eight bars, quasi-eight bars or virtual eight bars, reaching stochastics-A or ghost-A; the price line of the interval remains above the MA-14 line.
3. Interval  $t-1$  chart falls by four bars, reaching stochastics-A or ghost-A; the MACD histogram of the interval is positive.
4. Interval  $t-1$  chart falls by four bars, reaching stochastics-A or ghost-A; the price line of the interval remains above the MA-14 line.
5. Interval  $t-2$  chart falls for eight bars or more, quasi-eight bars or virtual eight bars, reaching stochastics-A or ghost-A; three falling waves are completed in interval  $t-3$  or interval  $t-2$ .
6. In the interval  $t-2$  chart, the market price falls to stochastics-A and breaks the MA-14 line from above; the MACD histogram turns negative. Interval  $t$  chart falls by R9 down-bars.

7. After falling by eight bars, quasi-eight bars or virtual eight bars in interval  $t-2$ , the market reaches interval  $t-2$  or the  $t-1$  Bollinger lower band+2.
8. After falling to interval  $t-1$  stochastics A, the market reaches the interval  $t$  Bollinger lower band+2.

The six-bar exception applies here too.

**The six bar rule in temporary pausing-downs:** Suppose the market falls before reaching a historical new high, with time interval  $t$  in the bull market. After type II or type III pausing-ups on the way down, the market is expected to bottom-up if it falls by six bars in interval  $t-2$  with the MACD histogram in the positive.

Now consider the complication of 1+1 pauses. In analyzing the pauses on a bear market rebound, a complication arises when there is a type IIc pause; the market displays a 1+1 pausing-down at a place where a two-bar pausing-down would be a type II pausing-down. The hesitation displayed in this case is between a type I and a type II pausing-down. It cannot be determined with a good degree of certainty whether the rebound is a temporary pausing-up or bottoming-up rebound. But most times, if after the 1+1 pausing-down and another wave up the market has not traveled enough to confirm it is the bottoming-up rebound, then there will be another turn towards the downside. The fall may be another 1+1 pausing-down, or a two-bar pausing-down, or topping-off.

Similar complication arises when there is a type IIc pause-up. In the process of a decline, if there is a 1+1 pausing-up at a place where a two-bar pausing-up would be a type II pausing-up, it cannot be simply viewed as a type II pausing-up. But if the market falls to a new low after the pause, it will very likely pause up again after completing another falling wave. To summarize, the following two rules can be stated.

**Implication of type IIc pause-downs:** After a type IIc pause-down on an uptrend, there are two possibilities:

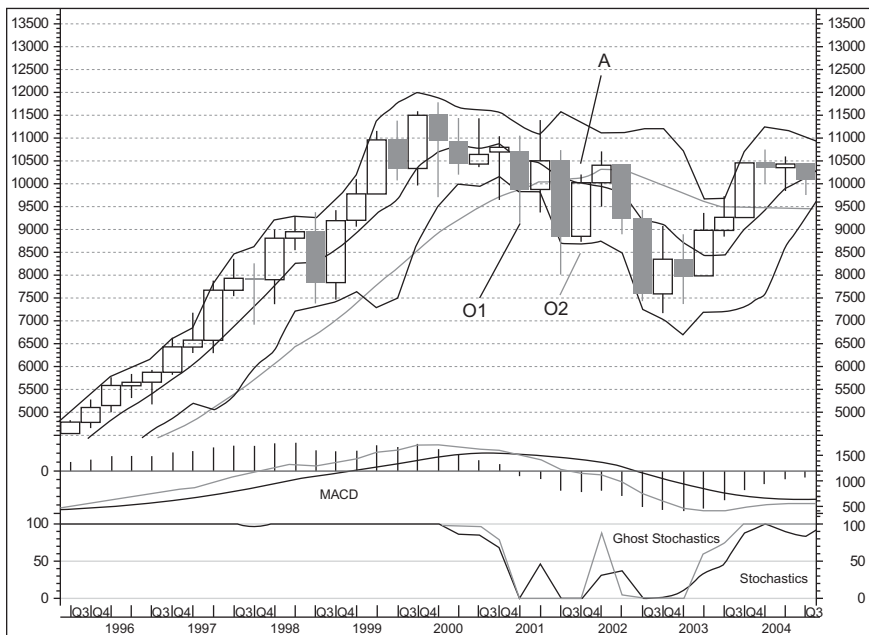
1. If the rise is not confirmed as the bottom-up rebound, then another type IIc or type II pause-down or top-off is expected at the next market downward turning point.
2. If the uptrend has been confirmed to be the bottoming-up rebound, or the uptrend has reached a historical new high, then at least a type I pause-down can be expected at the next downward pausing point.

**Implication of type IIc pause-ups:** After a type IIc pause-up on a downtrend, there are two possibilities.

1. If the downtrend is not confirmed as a topping-off fall, another type IIc or type II pause-up, or bottoming-up, is expected at the next market upward turning point.
2. If the downtrend has been confirmed to be the topping-off fall, then at least a type I pause-up can be expected at the next upward pausing point.

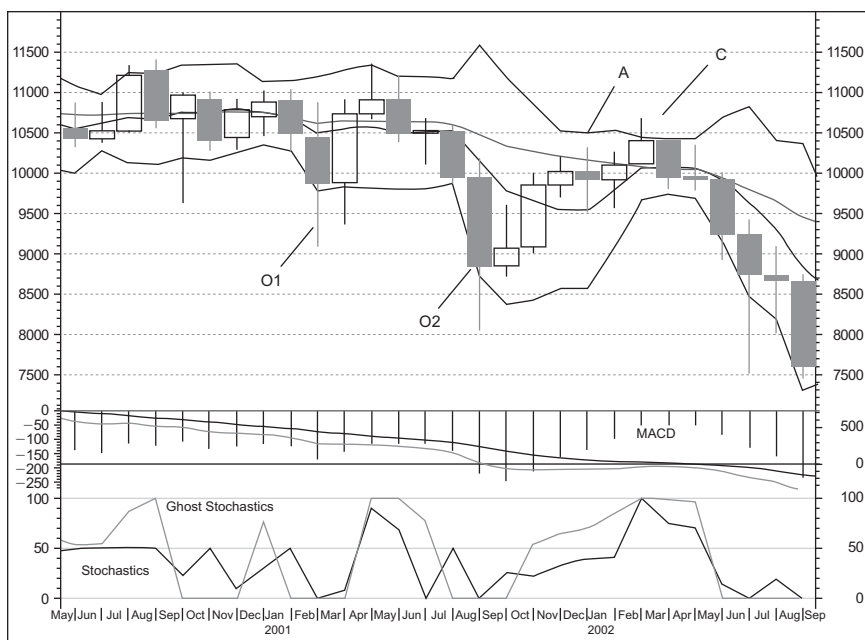
If one of the rising bars on the 1+1 pausing-up occurs before reaching the expected market turning-up point, and there is only one rising point after reaching the market turning point, then the 1+1 pausing-up more closely resembles a type I pausing-up. On the other hand, if both of the rising bars occurred after reaching the pausing-up point, then the 1+1 pausing-up more closely resembles a type II pausing-up. However, there are uncertainties in making the above inference.

Figures 6.5 to 6.10 illustrate a case of a temporary rebound being signaled by a type II pause-down. After the type II pause-down, the market tops off at the bear market cap. The charts are drawn with data from the Dow Jones Industrial Average.



**Figure 6.5** Quarterly interval reaching stochastics-A

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



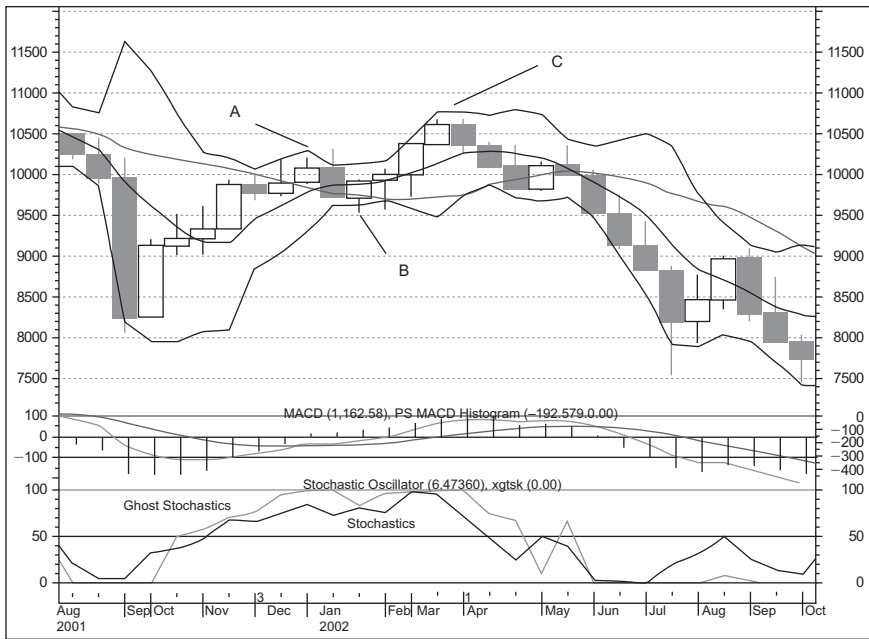
**Figure 6.6** Monthly interval chart tops off after rising for six bars

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

Figure 6.5 displays the chart for the quarterly interval, to be referred to as interval  $t-1$ . On the chart, stochastics-A is reached at point O1 for virtual eight bars down in interval  $t-2$ , the monthly interval. Point O1 is followed by two rising bars in the monthly interval, displayed in figure 6.6. The market then falls to a new low at O2, turning the half-year interval, referred to as interval  $t$ , into the bear market. The half-year interval chart is not displayed.

Figure 6.6 shows the monthly interval chart. The market tops off after rising from O2 to reach a resistance and stochastics-B at point C on the chart. At the topping-off point C, the market rises by six bars in the interval, referred to as interval  $t-2$ , and the MACD histogram remains negative. Thus, with interval  $t$ , the half-yearly interval in the bear market, the bear market cap is reached at point C, after a type II pause-down at point A. The type II pause-down is demonstrated in figures 6.7 to 6.10.

Figures 6.7 to 6.10 show that the pause-down at point A is a type II pause-down. At point A, the market rises by eight bars in the two-week interval, displayed in figure 6.7. This is followed with a hidden



**Figure 6.7** Two-week interval chart displaying a type-II pause-down

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

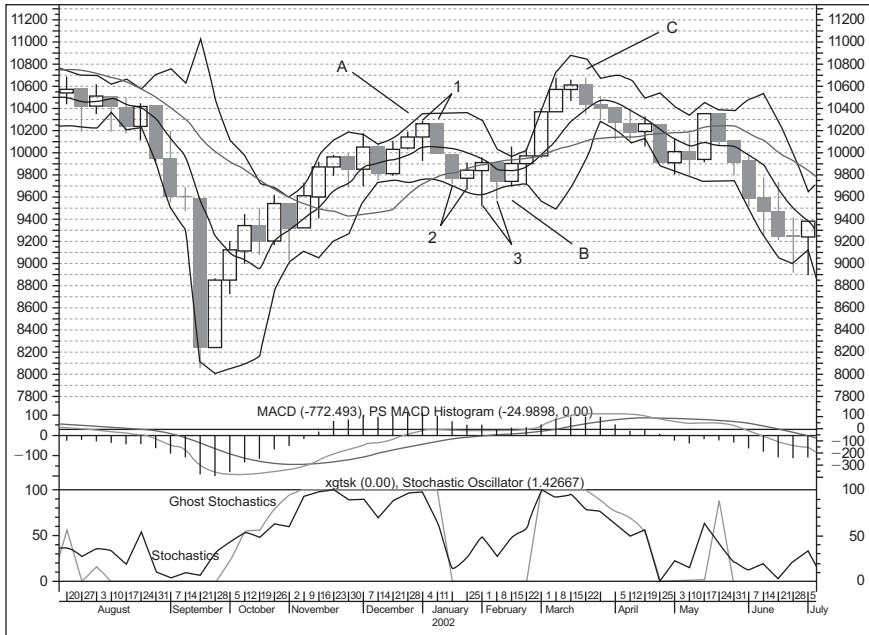
three-bar fall, in the interval, as indicated by three pairs of bars at point 1, 2, and 3 in the one-week interval chart. The one-week chart is displayed in figure 6.8. In figure 6.10, the market rises by two bars to stochastics-B in the daily interval chart, and then falls to the bear market at point B. Thus, the fall to point B is a continuation of the overall fall from point A. The total decline is measured by the duration from point A to B for three realigned bars in the two-week interval chart, signaling a type II pause-down.

Figure 6.7 shows the two-week interval chart, falling for a type-II pause-down from point A to point B. It is a realigned three-bar fall after an eight-bar rise.

Figure 6.8 displays the weekly chart. The two-week realigned three-bar fall is shown as the three pairs of falling bars at points 1, 2 and 3.

Figure 6.9 shows the two-day interval chart.

Figure 6.10 displays the daily interval chart. The fall from point A1 to B turned the interval from rising by two bars to the bear market.



**Figure 6.8** Weekly interval chart showing three hidden falling bars in the two-week interval

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

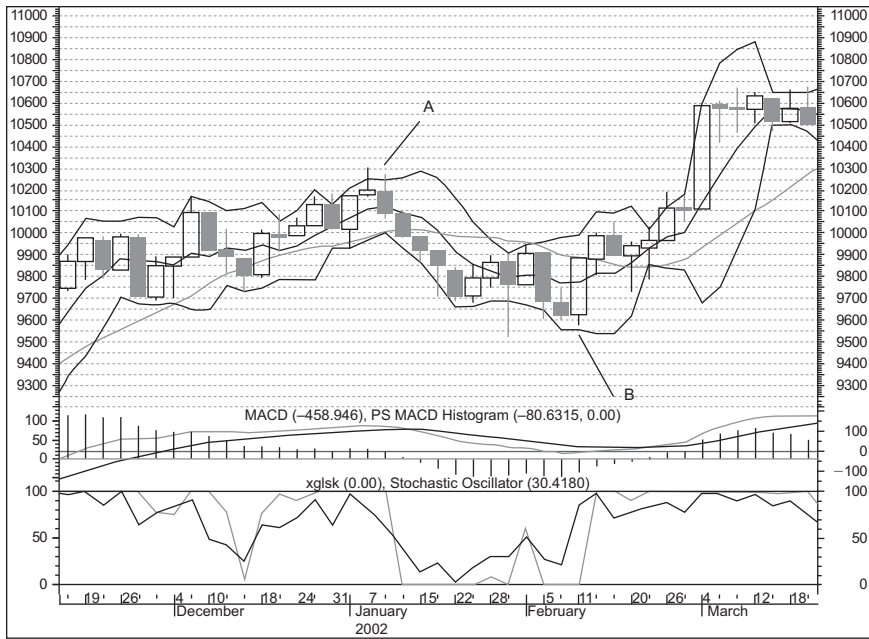
Thus the fall is a continuation of the decline that starts from point A and ends at point B. This ends the discussion of the case.

Turn attention now to the type III pause. It is the strongest signal indicating the temporary nature of the market movement. If on rebounding from a decline, the market falls for a type III pausing-down on the way up, this not only signals the rebound being temporary, but also indicates the topping-off being imminent. The reversal back to the original downward trend is expected before or on completing the next upwave or finishing a running thrust, most times without breaking into a new high.

**The cap after type III pause-down:** On rebound from a decline, if the market falls for a type III pausing-down, it is unlikely to reach a new high. It is expected to top off after rising to an interval  $t+1$  balanced market if the market has risen to an interval  $t$  balanced market before the type III pausing-down.

Similarly, the following rule can be stated for the lower bound of a fall after a type III pause-up on a temporary downward trend.



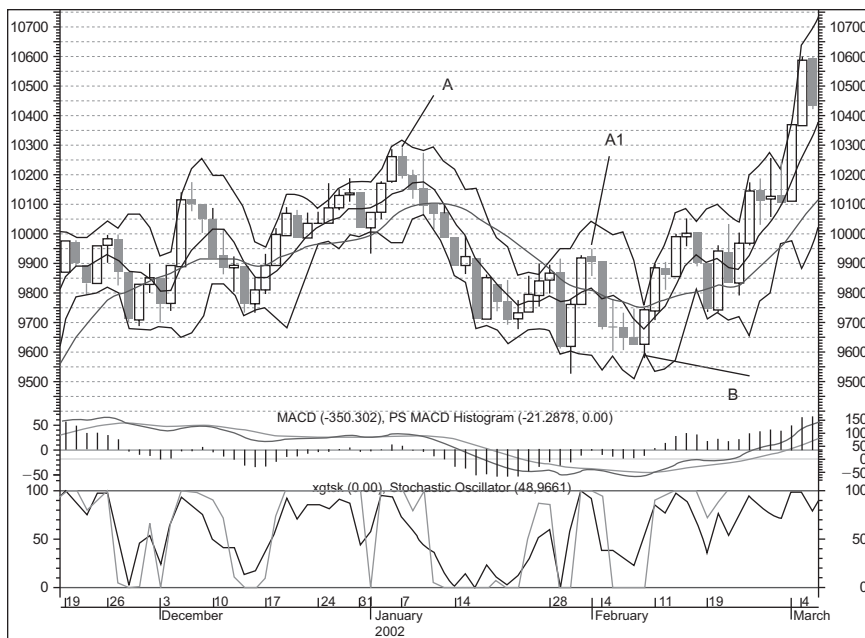


**Figure 6.9** Two-day interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

**The floor after a type III pause-up:** On a decline from a rising trend, the market rebounds for a type III pause-up. If the market falls again, it is unlikely to reach a new low. It is expected to bottom-up after reaching an interval  $t+1$  balanced market if the market has fallen to an interval  $t$  balanced market before the type III pausing-up.

To correctly apply the rules discussed in this section, say, to a temporary upward trend, it is important to correctly mark the starting point of the rebound. The duration of the rebound must be calculated correctly when it is compared with the duration of a pause-down on the way up in order to classify the pause-down into one of the three different types. Suppose after a temporary rebound on a declining trend, the market tops off, turning the bull market interval into the bear market. Then the temporary rebound has ended. Any rebound afterward should be considered a new rebound, not the continuation of the last rebound; the type II or type III pausing-downs registered earlier are no longer useful as signals to consider whether the new



**Figure 6.10** Daily interval chart showing continued fall from point A to B  
*Source:* Data used with permission from eSignal. Graphic used with permission from MetaStock

rebound is temporary. In evaluating whether a decline is temporary, similar considerations should be kept in mind when deciding on different types of pause-ups.

## 6.5 STRAIGHT PAUSES

After a rebound displays a type II or type III pausing-down on the way up, with rare exceptions, the rise is expected to be temporary only. The type II or type III pausing-downs reflect market participants' lack of confidence about the rise and the expectation of a further fall. However, the opposite may not be true; a temporary rebound may not be accompanied by type II or type III pause-downs. It is fairly common to see a temporary rebound with only type I pause-downs or no pause-down at all on the way up.

There is no easy way to provide a full explanation of the phenomenon, let alone anticipate it with a high degree of certainty.

It is possible that lower order interval signals may mislead investors focused on those intervals into believing that the rebound is a bottoming-up rebound. The market may be dominated by these investors before topping-off, displaying a strong rebound that resembles a bottoming-up rebound with only type I pause-downs on the way up. For easy reference, temporary rebounds with at most type I pause-downs before topping-off will be called straight pause-ups. Straight pause-downs can be similarly defined.

**Straight pause-ups:** Temporary rising trends with at most type I pause-downs on the way up.

**Straight pause-downs:** Temporary falling trends with at most type I pause-ups on the way down.

In the following, a few conditions are discussed that are most likely to lead to straight pause-ups. Under these conditions, most times there are at most type I pause-downs on the way up before topping-off; if the market falls for a type II pausing-down, then it is expected to top off on or before completing the next wave up. If the market displays a type III pausing-down on the way up, it is not expected to reach a new high before topping-off. It should be noted, however, that the conditions listed below do not exhaust all circumstances where straight pause-ups may occur.

Situations where straight pause-ups are expected:

1. With incomplete decline, interval  $t$  falls from stochastics-B to stochastics-A, and its MACD histogram remains positive; a temporary rise at this point is most likely to have only a type I pausing-down on the way up. In the event of a type II pausing-down, it is most likely to happen only after the market has completed at least half of the expected temporary rise.
2. On pausing-up from an incomplete decline after time interval  $t$  falls from stochastics-B to stochastics-A with the market remaining above the MA-14 line, the temporary rise is likely to have only a type I pausing-down before topping-off. If there is a type II pausing-down, it normally occurs after completing half of the expected rise.
3. Interval  $t$  is in the bull market; time interval  $t-2$  falls by eight bars or more, virtual eight bars or quasi-eight bars, while the interval  $t-2$  MACD histogram remains positive, or the price line in interval  $t-2$  remains above the MA-14 line, or the Bollinger lower band  $+2$  in interval  $t-1$  is reached. If the market pauses up, the rise is likely to be a straight pause-up.

4. The market falls for more than eight bars in interval *t* with MACD divergence, and reaches a higher order pausing point with the expected pause-up more than four bars in interval *t*, the pause-up is expected to be straight rises for at least two bars in interval *t*, i.e., the distance of a type I pause-up and less than halfway before the completion of the expected rise.
5. The market falls after rising to reach an interval *t* downward pausing point and a higher order market interval pausing point at the same time. After completing the expected duration of the interval *t* pause-down, before completing the expected high-order interval pausing-down, the market may rise for a straight pause-up.
6. Just before reaching a pausing point where a high-order pausing-down is expected, or on reaching but before completing the last bar of the high-order interval up-thrust, the market falls prematurely, then rebounds to complete the high-order upwave before starting the expected pausing-down. The above rebound after the premature fall may be a straight pause-up.

Similarly, on a temporary decline before completing a rising trend, the market normally displays type II or III pause-ups before bottoming-up. This reflects market participants' lack of confidence in the durability of the fall and expectation for further rise. But there are exceptions. The following are a few most frequently seen exceptions where on a temporary fall there are at most type I pause-ups before the final bottoming-up rebound; if a type II pause-up occurs, the market is expected to bottom-up before or on completing the next falling wave. If a type III pause-up occurs, the market is expected to bottom-up before making a new low.

Situations where straight pause-downs are expected:

1. On an incomplete positive trend, if interval *t* goes up from stochastics-B to stochastics-A and its MACD histogram remains negative, a temporary fall at this point is most likely to have only type I pause-ups on the way down before bottoming-up. In the event of a type II pausing-up, it is most likely to happen only after the decline has completed at least half of the expected temporary fall.
2. On pausing-down from an incomplete rise after time interval *t* rises from stochastics-A to stochastics-B with the market remaining below the MA-14 line, the market is likely to have

only type I pausing-ups on the temporary fall before bottoming-up. If there is a type II pausing-up, it normally occurs after completing half of the expected decline.

3. Interval  $t$  is in the bear market; interval  $t-2$  rises by eight bars or more, virtual eight bars or quasi-eight bars, while the interval  $t-2$  MACD histogram remains negative or the price line in interval  $t-2$  remains below the MA-14 line, or the Bollinger upper band  $+2$  in interval  $t-1$  is reached. If the market pauses down, it is likely to be a straight pause-down.
4. The market rises for more than eight bars in interval  $t$  with MACD divergence, and reaching a higher order pausing point with the expected pause-down more than four bars in interval  $t$ . Then the pause-down is expected to be a straight decline for at least two bars in interval  $t$ , i.e., the distance of a type I pause-down and less than halfway before the completion of the expected decline.
5. The market rises to reach interval  $t$  pausing point and a higher order interval pausing point at the same time. After completing the expected duration of the interval  $t$  pause-down, but before completing the expected high-order interval pausing-down, the market may fall for a straight pause-down.
6. Just before reaching a pausing point where a high-order pausing-up is expected, or on reaching but before completing the last bar of the high-order interval falling wave, the market rises prematurely then falls to complete the high-order down-wave before starting the expected pausing-up. The above fall after the premature rebound may be a straight pause-down.

When there are only type I pause-downs on a rebound, the path of the rebound does not provide signals for whether the rebound is temporary or permanent. In this case, alternative signals have to be examined. There are two ways to go forward.

**Strategy 1:** Evaluate the nature of the pausing point that generated the declining trend from which the rebound occurred. Accordingly, the expected duration of the fall is to be analyzed. If the expected decline has been completed, then the rise is a bottoming-up rebound.

This is a strategy that can provide the earliest signal if done correctly because the bottoming-up point is anticipated well before it is reached. The difficulty is to have a precise evaluation of the nature of the downward pause. To complicate the matter, the bottoming-up rebound point often varies slightly from case to case with the same

expected duration of the fall. Therefore, this approach involves some risk unless one is quite sure in evaluating the nature and duration of the pausing-down, and is willing to take long positions once the expected pausing-down is completed or close enough to completion, and hold the position through the possible fluctuations before the final bottoming-up. In case the bottoming-up rebound may occur slightly earlier before the anticipated completion of the fall, one may use the stochastics indicator in the conventional way for the timing of the rebound with the interval appropriately chosen, i.e., the highest order interval that has fallen by eight or more points, or virtual eight points or quasi-eight bars. After taking a long position on the signal, hold it through the final phase of the fluctuation before the market bottoms up.

For a flavor of the complications that may be involved in terms of the precise timing of the bottoming-up even when the nature of the pausing-down is correctly anticipated, the following are some examples.

1. On a bottoming-up rebound, the market falls temporarily when interval  $t$  rises for eight bars. The fall is not expected to be more than a type I pause, i.e., not more than two falling bars. However, it may return to the rising trend after falling just for one bar. In this case, one has to decide on how to deal with the uncertainties with regard to the possible second falling bar.
2. In the same situation as in case 1, but the market may bottom-up after falling by three bars in interval  $t-1$ , instead of one or two bars in interval  $t$ .
3. On a bottoming-up rebound, but close to a high-order downward turning point, the pausing-down on the way up may be type II, instead of type I.
4. When a two-bar pause-down is expected, the market may pause down for a  $1+1$  fall instead.

Therefore, at the margin it involves considerable uncertainty to base one's timing decision on the nature of the pausing point and the expected duration of the pause. If the countertrend movement is expected to be a type I pausing-down for two bars in interval  $t$ , for example, it is possible that the bottom-up rebound will start after the market falls for just one bar in interval  $t$ ; but it is also possible that the fall may last for slightly more than two bars in interval  $t$ . This means anything between two bars to five bars in interval  $t-1$ .

**Strategy 2:** Wait until the bear time interval turns bullish to confirm the bottoming-up before taking a long position in case the rebound is a bottoming-up rebound. Alternatively, if the rebound is only expected to be temporary, wait either for a type II pausing-down, and then short at expected topping-off point, or for topping-off signals in the form of the bull market interval turning bearish.

The risk involved in using strategy 2 is much smaller as bearish/bullish signals are much more clearly defined and robust, while the nature of the pausing point used in strategy 1 involves more uncertainty. But focusing on bearish/bullish signals of lower order intervals has its drawbacks. First, it takes more time for the signal to be confirmed. Second, in the case of a premature fall, the bottoming-up signal may be followed by an immediate fall after reaching the expected high-order pausing-down point. Therefore, the nature of the pausing point cannot be ignored completely.

Whether strategy 1 or strategy 2 should be adopted depends on two things:

1. One's willingness to bear the uncertainty associated with strategy 1;
2. Whether it is possible to make an accurate assessment of the nature of the pausing point and the associated duration of the pause.

Let us go back to what initiated the above discussion, that type I pause-downs do not provide information about the nature of the rebound. It does not help to decide whether the rise is a bottoming-up rebound or just a straight pause-up. The problem would be resolved if it were possible to fully categorize the situation associated with straight pause-ups. Unfortunately, the best that can be said about straight pause-ups is that they appear to be generated by some confusion or misreading of market conditions by a segment of the market participants. The list above provides examples consistent with this interpretation, but it is far from being a complete list of all possibilities.

Similarly, complications arise when there are only type I pause-ups on a falling trend. It cannot be decided whether the falling trend is a complete reversal of the last rising trend or just a straight pause-down. The case can be discussed along similar lines as in the case of straight pause-downs and will not be repeated here. One exception to note is that after reaching a historical new high, there are only pausing-downs

in the stock market for the broad market index; whatever the nature of the falling path, the decline is only temporary.

## **6.6 EXCEPTION 1: COMPOSITE BOTTOMING-UP AND COMPOSITE TOPPING-OFF**

It is not controversial to say that the stock market is complicated. There are often exceptions to the rules. For one reason, new information may change the views of market participants, moving the market away from the path indicated by earlier signals. But it does not occur with high frequency that expected high-order interval chart patterns are fundamentally changed by news. The higher the order of the time interval, the less likely that the signals from the interval will be made invalid by new information. It is hard to imagine that signals from a one-year interval can be made invalid by events other than concerted government intervention. An event of the magnitude of the 9/11 terrorist attacks may have at most changed the course of the market signaled by the quarterly interval chart, turning the market from being bearish in the half-yearly interval into one being bearish in the yearly interval. More detailed discussion of the case is provided in the case studies.

Most times, complications occur or the signals become muddy because market participants try to move ahead of the market. For example, there are often false rebounds just before the completion of a downward thrust. Those efforts to run ahead of the market in general do not alter significantly the big picture of market dynamics. But they do alter the course of the market at the margin from time to time. One example is the uncertainty with regard to the duration of a pause, especially when the market is rising on a bottoming-up rebound; a two-bar pause-down may be shortened to a one-bar pause-down before further upside, as the market correctly anticipates the pause as only temporary. Another example is the straight pause-up, where the market participants incorrectly anticipate a bottom-up; as a result, the course of a temporary rebound is altered to resemble a bottom-up rebound.

In this section, the focus is on market participants' attempts to run ahead of the market before a turning point is reached. To be more concrete, consider a turning point on a declining trend where a market rebound is expected, especially when a bottom-up rebound is expected. There will be market participants trying to accumulate long positions in anticipation of the bottoming-out. If the moves come too far ahead



of the expected turning point, the market will fail in the rebound and fall again, turning the bull market interval into the bear market after topping off from the rise and displaying a reversal of the temporary uptrend. It may or may not reach a new low after the failed rebound, depending on whether the anticipated turning up point has been reached after the renewed fall.

There are times, however, when the premature rebound occurs very close to the final expected bottoming-up point. For example, the market falls by seven bars without reaching a support, while the rebound is expected after declining by eight bars. In this case, after a type II or III pause-down on the way up, the market may fall again. The ensuing fall may complete the overall decline of the required eight down bars before the topping-off is confirmed and without the temporary uptrend being reversed to a downtrend. As a result, the market starts the bottom-up rebound, with only type I pause-downs without a clear separation from the earlier premature rebound. What is observed here is type II and III pause-downs followed by the bottoming-up rebound with only type I pause-downs afterwards. The premature rebound is linked closely with the final bottoming-up rebound. The link is so close that without referring to the required completion of the high-order downward thrust before the rebound, it is impossible to separate the final bottoming-up rebound from the premature rebound. This is one exception to keep in mind when applying the rule that after type II or type III pause-downs, the rebound is not expected to last. For convenience of reference, this case of a premature rebound being closely linked with the expected rebound is called a *combo-rebound*. While in the above example the expected rebound is a *combo-bottom-up rebound*, it can be a *combo-pause-up* as well.

The best point to evaluate the duration and the type of a pausing-down is when a given time interval  $t$  reaches stochastics-B, time interval  $t$  or  $t-1$  completes an upwave or quasi-upwave, and time interval  $t+1$  reaches the Bollinger upper band  $+2$ . If at such a pausing point, the market continues to rise or only falls for a type I pausing-down, following a type II or type III pausing-down, then it is a *combo-rebound*. The earlier type II or type III pausing-downs should be ignored. The rebound should be viewed as having type I pausing-downs only. Recall that in this case, the nature of the rebound becomes indeterminate. Other signals will have to emerge before a decision can be made on whether it is a bottom-up rebound or just a temporary pausing-up. Alternatively, the situation may be evaluated on the basis of whether the anticipated decline has been completed.

In general, in evaluating the direction of the stock market, near-term signals are more valuable than signals further in the past.

On rare occasions, the stock market may rise after a type II pausing-down, followed with a type I pausing-down, then type II pausing-down or type III pause-down again, before rising for good, turning the bear market interval into the bull market to confirm the bottoming-up rebound.

In the above hypothetical case, the first type II pausing-down was followed by a type I pausing-down as a result of reaching a pausing point towards the upside. The type II or type III pausing-down that follows is a result of the overall decline not being completed yet. The overall decline is completed after the second type II or type III pausing-down; the bottom-up rebound starts afterwards.

Similar to the combo-rebound, there may be type II or type III pausing-ups followed by the topping-off with type I pausing-up only afterwards. This will be referred to as a “combo-top-off” where the rise is completed after the type II or type III pause-up. A “combo-pause-down” can be defined in a similar way with the anticipated fall being a pause-down instead of the topping-off. The analyses made on a combo-rebound can be applied similarly to a combo-top-off or combo-pause-down if the fall occurs without reaching a new high or turning the bear market interval into the bull market. In evaluating whether the fall is a topping-off fall, the most recent signal is more important than the signals further in the past.

Note once again that if the topping-off occurs after reaching a historical new high or the bear market interval is turned into the bull market, the situation is different. In this case, the market returns to resume the uptrend in the high-order interval. Since the overall market trend is positive as a result of continued economic growth, any fall after reaching a new historical high, or after the overall uptrend of the high-order interval is resumed, is expected to be a temporary pausing-down. Type II or type III pausing-ups on the way down are always possible, although not guaranteed.

## **6.7 EXCEPTION 2: APPROACHING THE TURNING POINT**

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There is another case where type II pausing-downs may appear on an uptrend with the bear market interval turning bullish to confirm a bottom-up rebound. This may happen when the market is approaching (but has not yet reached) another high-order falling point after the

bottom-up. In this case, the market may fall at the point of the bear market cap for a type II pause-down, then rise to a new high to confirm the bottom-up rebound; or the market may rebound to turn the bear market interval  $t$  into the bull market first to confirm the bottom-up rebound, then fall for a type II pausing-down. In either case, the bear market interval turning bullish remains effective as the signal for a bottoming-up rebound. However, the type II pausing-down sends a strong signal that the next high-order downward turning point is approaching; and there will be at least a type I pausing-down at the next downward turning point.

**Bottom-up rebound + type II pausing-down:** The market rebounds with time interval  $t$  in the bear market. If time interval  $t-2$  rises for eight bars, quasi-eight bars or virtual eight bars, followed with declines for a type II or type III pausing-down before rebounding to turn time interval  $t$  into the bull market, then the market has bottomed up. But the next high-order downward pausing point is approaching. The market is expected to fall for at least a type I pausing-down at the high-order downward pausing point, before which the market is expected to fall for a type II pausing-down at lower order pausing points on the way up.

**Confirmed bottom-up rebound + type II pausing-down:** The market rebounds to turn the bear market interval  $t$  into the bull market, confirming a bottoming-up rebound, then falls for a type II or III pausing-down before rising further into a new high. The type II or type III pausing-down signals that the next high-order pausing point is approaching, where at least a type I pausing-down is expected. Before the high-order interval downward pausing point, a type II pausing-down is expected at lower order time interval pausing points.

While only a type I pausing-down can be firmly expected at the completion of a higher order thrust and the reach of the downward turning point, the signal is still very useful for two reasons. First, there may not be any pause at the pausing point without the signal. Particularly, when the market is at a historical new high, it may continue to rise without a pause, or fall for less than a full type I pause-down after completing a higher order thrust. However, with the signals mentioned above, it is certain that at the next pausing point, there will be at least a full type I pausing-down. Second, with the market in a new high and the pause expected involving a high-order interval, a type I pausing-down can be a quite substantial decline both in terms of duration and depth. Where the order of the time interval involved is high enough, it is entirely possible that the type I pausing-down may be a "bear market decline" in the conventional sense of a more than 20 percent fall.

The signal is particularly useful after strong rises, which makes taking short positions very risky and raises the opportunity cost of getting out of a long position. With the signal, the pure certainty of the fall goes a long way to reduce the risk of large losses from taking a short position or the opportunity cost of getting out of a long position if the market continues to move up strongly. Where the expected fall is of a high enough interval, say, a type I pause-down of two bars in the monthly or quarterly interval, the certainty will make it possible to commit large amounts of capital to take advantage of the fall, and with a more aggressive timing to capture the gains generated by most of the downward movement.

Similarly, when the market declines to confirm a topping-off, but the fall is associated with a type II or type III pausing-up, the following rules apply.

**Topping-off with type II pausing-up:** If the market declines with time interval  $t$  in the bull market, but on the way down rebounds for a type II or type III pause-up before falling again to turn interval  $t$  into the bear market, then the topping-off is confirmed. However, the market is expected to make at least a type I pausing-up after completing the next high-order thrust to reach an upward turning point, before which type II pausing-ups are expected at lower order pausing points.

**Confirmed topping-off + type II pausing-up:** After declining to confirm the topping-off, the market rises for a type II or III pause-up before falling to a new low. The type II or type III pausing-up signals the approaching of the next high-order upward turning point, where the market is expected to rebound for at least a type I pausing-up. Before the high-order turning point, the market is expected to make type II pausing-ups at lower order pausing points.

## 6.8 RELATIONSHIP BETWEEN LOW- AND HIGH-ORDER SIGNALS

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The focus of this chapter has been on using low-order (interval  $t-2$ ) signals to confirm high-order (interval  $t$ ) trends or trend reversals. The advantage of using low-order signals to confirm a high-order trend is that the rules are robust, unambiguous and objective. Furthermore, they are more timely compared with traditional indicators such as the MACD histogram calculated on the data from high-order intervals. However, it is important not to ignore higher order interval conditions completely. During the course of the discussion, reference to higher

order conditions has been made numerous times. This is because in a number of situations, knowing the high-order condition is crucial for understanding the market dynamics correctly.

First, there are times when lower order intervals fail to provide adequate signals, primarily in the case of a rebound with only type I pause-downs or a fall with only type I pause-ups. Second, if done properly, high-order analysis can be used for faster signals. For example, with the market on a downward trend and interval  $t$  in the bear market (interval  $t-1$  in the balanced market), a bottoming-up rebound may be confirmed by low-order signals when interval  $t$  moves up by four bars. But if it can be determined from analyzing high-order interval conditions that the fall is a two-bar, type I pause-down in interval  $t+1$ , then the bottom-up can be anticipated right at the bottoming-up point, rather than having to wait for four rising bars in interval  $t$ .

Furthermore, there are times when low-order signals may suggest different market actions than that indicated by higher order signals. In general, higher order signals dominate lower order signals. For example, lower order signals may confirm a bottom-up rebound, but a high-order downward pausing point is reached before rising to a new high, or right after the new high is reached. In this case, the market will start another fall right after the low-order time interval signals confirm a bottom-up rebound. For another example, on a temporary rebound, the market falls for a low-order type III pause-down, but completes the expected high-order decline on the way down; the low-order signal for topping-off is dominated by a higher order signal of completion of the decline. Consequently, the market rebounds to a new high instead of falling to a new low. Therefore, even with clear low-order interval signals, it is important to know the direction of high-order intervals so that actions are not taken against signals from high-order intervals. Here low-order and high-order are used in relative terms, rather than defined with any absolute criteria.

The importance of the last point cannot be overstressed. It is critical to keep in mind that high-order conditions dominate low-order conditions. In general, action should not be taken on low-order signals against a higher order running trend without the support of a robust forecast.

However, this does not mean that action should never be taken against a higher order trend. Otherwise, one would always be in long positions in the stock market as the highest order interval is always on a positive trend. What is required is that positions are not taken against immediate market actions signaled by high-order time intervals. For

example, when a high-order time interval reaches a downward pausing point, a long position should be avoided even when lower order intervals suggest a positive trend or display an incomplete upwave (or any continuation patterns suggested by indicators or tools not mentioned in this book, such as channels, trend lines, etc.) The precise timing at a high-order interval turning point is given by the 2-of-3 rule mentioned previously.

When positions are taken against an unfinished high-order running trend on pausing points, it is important to be extra cautious. The position can be held more aggressively if the duration of the expected pause is highly certain following a type II pause. Otherwise, the following rule can help to avoid unexpected large losses.

**The halfway rule:** Before the completion of the upside thrust of a high-order time interval on a bottom-up rebound, a straight pause-up, or after reaching a historical high, short positions should be avoided after the market completes half of the expected decline in lower order time intervals on any downward pauses. Similarly, before the completion of the downside thrust of a high-order interval on straight falls, long positions should be avoided after the market completes half of the expected temporary rises in lower order time intervals on any upward pauses.

## 6.9 TRADING STRATEGIES ON TREND SIGNALS

There are many trading strategies that can be designed based on the rules described in the previous sections. Once the market dynamics governed by these rules are understood, the trader can easily come up with personalized strategies based on individual risk preference. The reader may also blend the FVITA system with other indicators or technical tools not mentioned here. But this will take time. It will probably take a month or so to acquire a good degree of proficiency in the system if it is used on a daily basis to trade intra-day charts. To facilitate this process and provide a fast start, this section offers a discussion of the main trading opportunities.

Before the discussion of trading opportunities, two issues need to be clarified so that the reader will have a clear sense of the return from committing time to mastering the system. First, how robust is the system? How extensively has the system been tested? How are the parameter values and different indicators selected? Second, is it possible to trade such a system without having it automated? Can a trader handle the complexity in real time trading intra-day charts?

To answer the first question, the system is highly robust, working 90 percent of the time. This refers to the two major results. First, a new permanent trend has been established and the old trend is reversed when a bear/bull market switch occurs, i.e., when the bear market interval is turned into the bull market, or the bull market interval is turned into the bear market. Second, after type II and III pauses on a trend, the trend is confirmed as being temporary; trend reversal is expected at or before reaching the bear market cap on the rise or bull market floor on decline. The qualification for the second result being robust is that the starting point of the temporary market movement needs to be counted correctly, i.e., after the completion of the earlier thrust. This is a complication that happens roughly 30 percent of the time. It takes practice to remember.

After the research had been largely completed in setting up the main structure of FVITA, the results were tested extensively over the course of more than two years on a daily basis on real time intra-day charts, starting from the 1-minute interval. They were further tested on historical charts on the daily and higher order interval data extending for 10 years. Broad market indices are used for the testing. The test was done manually due to two reasons. First, it is highly complicated to specify fully the states of the market in computer language with all the combinations of different interval charts each with a number of different conditions. There are just too many contingencies. On the other hand, the conditions are easy to check manually with the eyes if one is familiar with the system. Second, the failure rates of the system are low, so that the manual checking can be done quickly without many complications needing special attention.

The principle involved in the indicator selection has been discussed in chapter 2. After being separated into two groups, one measuring trend and the other measuring perturbation, the indicators were compared for their robustness and added information content before the best ones were selected. The search was a trial and error process done with manual testing based on intra-day charts. Similarly, the parameter values were also decided in the same process based on a localized search around the values already adopted in the existing analyses. The localized search was justified on the assumption that the conventional parameter values are the result of accumulated learning achieved in the process of their application; they should not be far from the optimal.

The second question about the seeming complexity of the system and the ability of a trader to handle it is understandable. But it does not take long to overcome the problem. It is a matter of getting used to

the system, not an issue about the required calculating power. The system can be easily used for intra-day trading once the trader is familiar with the structure and the rules. It will take a month or so to achieve the familiarity with the system if the system is used on a daily basis for intra-day trading with a focus on the 1-minute or 4-minute chart. At the beginning, the user may feel overwhelmed by all the different time frames needing attention. It also takes time to gain proficiency in analyzing the interactions between different indicators governed by various rules. However, once the user gets over the first stage of assembling the different pieces of information into an integrated structure in his mind, it will become increasingly easier to glance over the charts for a quick read of the state of each interval, and to decide quickly which interval should be the focus of attention. Because states of different intervals change in sequence, the updating required is spread over time. As a result, it is not difficult to keep up with a live market.

Having addressed the main potential concerns, the rest of the section discusses strategies to take advantage of the major trading opportunities on anticipated or confirmed market trends.

The first strategy, with high certainty and plenty of room for profit, is to take short positions on an expected topping-off at bear market caps or to take long positions on an expected bottoming-out at bull market floors. To be more specific, consider the case for taking short positions at bear market caps. Suppose the market rebounds with interval  $t$  in the bear market. On the way up, type II or type III pause-downs are observed before a further upside. Then the market rises to a new high with interval  $t$  remaining in the bear market. As a result, the rise is signaled to be temporary only, topping-off is expected after the rebound reaches the bear market cap, given by eight up-bars in interval  $t-2$  or the other variations as listed in the bear market cap rules. This provides the setup for the strategy to take short positions when the market reaches the bear cap.

The point to take profit and close the short position will depend on the trader's risk preference. Suppose the trader is ok with riding off a two-bar upward countermovement in interval  $t-1$ , but would not be willing to sustain the loss of a four-bar countermovement or more in interval  $t-1$ . Then the short position should be maintained after the topping-off until the market falls for eight bars in interval  $t-1$  to reach the balanced market in interval  $t$ . The pauses on the way can be ignored as they will be of a tolerable duration. But after the balanced market in interval  $t$  is reached the pause should be avoided because it normally is expected to be at least a type II pause-up for four bars in interval  $t$ , after the pause-up at  $t-1$  interval balanced market.



In case the trader's preference is characterized by a maximum holding period for countermovements of two bars in interval  $k$ , with  $k < t-1$ , there will be pausing points on the way down that should be avoided before the market completes eight falling bars in interval  $t-1$ . More details about temporary pausing points will be discussed in the next chapter.

On rare occasions, the strategy may fail, for example, as a result of miscounting the starting point of the uptrend. The position should be aborted on two conditions. First, if the market continues to rise after reaching the bear market cap and completing the up-thrust. Or second, the market falls first, but rebounds to reverse the falling trend, i.e., turning the bear market interval into the bull market.

The setup and strategy for taking long positions at the bull market floor are symmetric to the shorting strategy at the bear market cap. Suppose the market is on the decline with interval  $t$  in the bull market. If type II or type III pause-ups are observed on the way down, then the bottom-up is assured after reaching the bull market floor, given by eight down-bars in interval  $t-2$  or the variations given by the bull market floor rules. The strategy is to take long positions on the market reaching the bull market floor and maintain the position until the next turning-down point that is associated with a countermovement larger than what can be tolerated by the trader.

If the trader is ok with riding off a two-bar downward countermovement in interval  $t-1$ , but would not be willing to sustain the loss of a four-bar countermovement or more in interval  $t-1$ , then the long position should be maintained until the market rises for eight bars in interval  $t-1$  after the bottoming-up to reach the balanced market in interval  $t$ . The pauses on the way can be ignored as they will be of a tolerable duration.

In case the trader's preference is characterized by a maximum holding period for countermovements of two bars in interval  $k$ , with  $k < t-1$ , there will be pausing points on the way up that should be avoided before the market completes eight rising bars in interval  $t-1$ . More details about temporary pausing points will be discussed in chapter 7.

The long position should be aborted if the market continues to fall after reaching the bull market floor and completing the down-thrust, or if the market rises first, then falls for a reversal of the uptrend.

The second robust strategy to take a position with anticipated trend reversal is based on the expected type I pause after a higher order trend has been established, but not yet completed. To illustrate the strategy with a specific example, suppose on a positive trend there is a type I pause-down of two bars after eight up-bars or R9 up-bars in

the monthly interval. The pause-down turns the two-week interval into the bear market. Suppose the market then rises to turn the two-week interval into the bull market, confirming the bottom-up rebound. On the way up before reaching eight up-bars or R9 up-bars in the next order time interval, the quarterly interval, pausing points in lower order intervals are expected to be type I in nature. Therefore, after rising for eight days or R9 days, whichever may apply, and then pausing-down for two days, the market is expected to bottom-up. The strategy, then, is to take long positions in anticipation of another eight days up after the completion of the type I pause-down of two days, assuming that the trader can tolerate a one-day countermovement that may occur on the way up.

The third trading strategy is to take a position in line with a new market trend after the reversal of the old trend is confirmed, rather than in anticipation of a new trend. A rising trend is reversed when the bull market interval is turned into the bear market; a falling trend is reversed when the bear market interval is turned into the bull market. This third strategy may appear to be slower than the first two strategies, with the possibility of forgoing considerable profit between the turning of the market and the confirmation of the new trend. But the strategy is still valuable for two reasons. First, sometimes the market changes direction without first displaying type II or type III pauses against the original trend. In this case, there is no signal for employing the first strategy. Second, even when a market movement is judged to be temporary and a trend reversal is expected, the reversal may take place before reaching the maximum possible limit such as the bear market cap or bull market floor discussed in the first strategy, or a full type I pause discussed in the second strategy. In this case, neither the first strategy nor the second strategy can be employed. But the third strategy will still allow the trader to take a second best approach to trade the trend once it is established.

To be more specific, consider the same example as given in illustrating the second strategy. Suppose everything else is the same except that the market bottoms up after falling by one day instead of completing a full type I pause-down of two days. In this case, once the bear market interval turns into the bull market to confirm the trend reversal towards the upside, long positions can be taken in anticipation of another eight days up, assuming as before that the trader can tolerate a one-day countermovement that may occur on the way up. It is still possible that another day of falling may follow for a 1+1 day type Ic pause-down, before rising for the expected eight up-days. But the risk

is worth taking given that a one-day market movement against the position can be tolerated.

Similar strategies can be described for short positions when a downward trend is confirmed

To conclude the discussion, it is worth noting two important points when applying the above three strategies. First, high-order interval conditions dominate low-order conditions. The expected eight up-bars or R9 up-bars may be truncated if a higher order turning point has been reached. The second point to keep in mind is that on approaching a high-order turning point, the market is likely to become increasingly choppy. For example, on approaching quarterly eight up-bars, the market may start to show significant downward pauses in terms of daily and weekly charts at the seventh up-bar in the quarterly interval. Extra caution will need to be taken to allow both early and late trend reversals in the lower order, daily, two-day, weekly and two-weekly time intervals.



## Pauses Under Different Market Conditions

In analyzing the stock market, it is useful to keep in mind the asymmetry between the up side and the down side. When the market rises to a historical new high, with infrequent exceptions where the MACD histogram of an interval chart may turn negative, there are only time intervals in the bull market or balanced market with none in the bear market. Furthermore, there are no resistance points as defined in this book. While there are resistance levels as defined in other ways employed by technical analysis, the effects of the resistance levels are relatively weak, with less than type I pause-downs, unless combined with the completion of thrusts. Therefore, attention can be focused on the completion of waves thrusts, i.e., eight rising bars or R9 up-bars.

When the market is on a decline, it does not normally reach a historical new low. Therefore, pausing-ups normally occur at supporting points, although it is also possible that the temporary rises may start without reaching a supporting point after completing three down-waves or R9 falling bars.

Similarly, when a fall occurs without reaching a new high, it normally starts at a resistance level. It may also fall without reaching a resistance level by completing three upwaves, or R9 rising bars, but with a lower frequency.

For the above reasons, the pausing-downs after reaching historical new highs are discussed here separately from the other two cases of temporary countertrend movements—pausing-downs before reaching a historical new high, and pausing-ups on a decline.

As noted before, falls after reaching a historical new high should be considered temporary pausing-downs, rather than topping-offs. The economy is certain to grow after any cyclical downturn, thus the market will

surely rebound to a new high after any decline. The overall trend of the economy and therefore that of the stock market is positive. After the market reaches a historical new high, leaving no time interval in the bear market, any fall should be considered a temporary pausing-down only.

Before discussing pause-downs after the market rises to a historical new high and reaching a highest order interval turning point, it is worth noting a potential problem. The length of the history affecting today's market may have an upper limit; beyond this upper limit, the influence from past history may no longer be present. Technical analysis is built on the assumption that the historical time path can be used to forecast future market dynamics. This assumption will be used to its fullest extent in analyzing the nature of the pausing-downs at historical new highs when the highest order intervals with enough history for technical analysis will be used. Notice that the bigger the interval size used, the larger the impact of the forecast (or forecasting errors). For example, after R9 up-bars in the ten-year interval, a type I pause-down is forecast to last for 20 years. Therefore, as the length of the market history expands and the interval size of the highest order chart being used for analysis increases, questions have to be asked as to whether there is an upper limit beyond which history may no longer be effective as the base for forecasting the future. If this is the case, a decision will have to be made on the highest interval  $t$  to be used in technical analysis, and what to do after that interval  $t$  reaches a balanced market. For now this upper limit does not appear to have been reached as the system still works fairly well in describing the market movements. But for stock markets with a long history such as the US market, it may be the time to think about the issue.

## **7.1 PAUSING-DOWN FROM A HISTORICAL NEW HIGH**

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With all time intervals in the bull market or balanced market and none in the bear market, the market most times is dominated by bullish sentiment, unless imminent falls are signaled by MACD divergence or the MACD histogram turning negative. Before the completion of high-order upside waves, or reaching other types of high-order downward pausing points, the pausing-downs generated by lower order time intervals are normally short, type I pausing-downs and often with a slightly shortened duration when compared with normal type I pausing-downs; it is possible that there may be no pausing-down at all after a lower order interval upward thrust. This is the place where market manias are observed; it is also the place

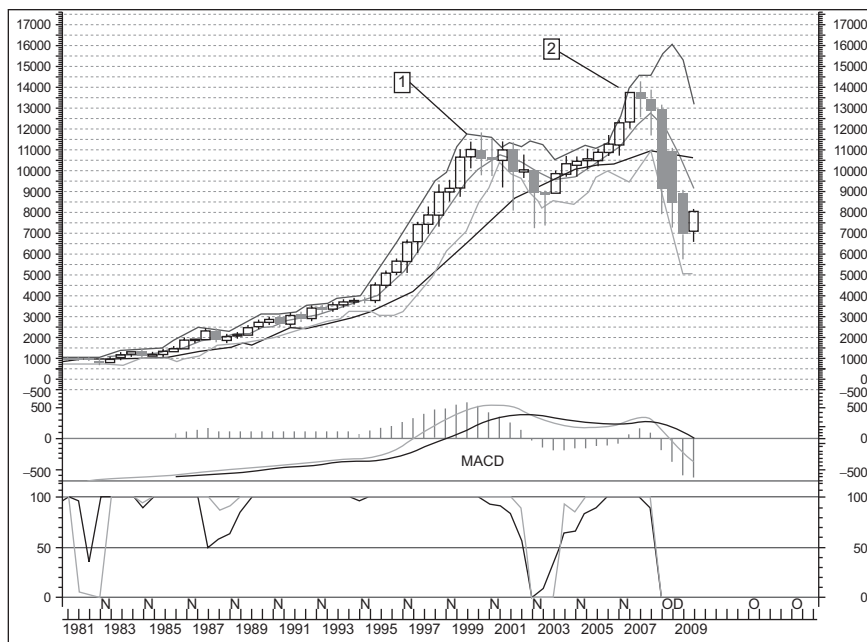
where spectacular crashes occur. Therefore, it is important to know when a pausing-down will happen and anticipate the duration of the pausing-down as accurately as possible. To this end, the following rule is very useful. It provides a number of conditions under which the market is expected to make a full type I pausing-down. The conditions are extremely useful in anticipating major market crashes and distinguishing them from minor downward adjustments.

**Pausing-down from a historical high:** After the market rises for eight bars or more in time interval  $t$ , it is expected to make at least a full type I pausing-down, i.e., falling by two bars in time interval  $t$ , or eight bars (or virtual eight bars) in time interval  $t-2$  if one of the following conditions is satisfied:

1. The MACD histogram in interval  $t$  is negative; the market has risen for eight up-bars after the last two-bar or more pause-down in interval  $t$ ; a rising wave of interval  $t-1$  is completed.
2. MACD divergence is observed; time interval  $t$  rises for R9 up-bars.
3. Time interval  $t$  completes a rising wave or rises for R9 bars, there are type II or III pausing-downs in interval  $t-1$  on the way up.
4. The MA-14 line in time interval  $t+1$  breaks the Bollinger lower band from below; time interval  $t$  rises for R9 bars, or for more than eight bars with time interval  $t-1$  completing three rising waves.
5. Time interval  $t-1$  completes three or four rising waves; time interval  $t$  or a higher order time interval completes a rising thrust.
6. Time interval  $t$  rises for R9 up-bars to reach one of traditionally defined resistance levels.

The first three are fairly robust conditions for expecting a pause-down, working about 85 percent of times. The last two conditions work with more uncertainties. As the main exception associated with the 15 percent of failures, the first four conditions may be followed by just a one-bar pause-down or a 1+1 bars pause-down instead of a straight two-bar decline.

Figure 7.1 shows a pause-down after a MACD divergence in the half-year interval. The chart is drawn on half-yearly data from the Dow Jones Industrial Average. At point 2 of the half-year interval chart, the market reaches a new high, but the MACD fast line is below point 1. A two-bar pausing-down is expected with total duration of a year. In the meantime, the MA-14 line breaks the Bollinger lower band



**Figure 7.1** MACD divergence in the half-year interval

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

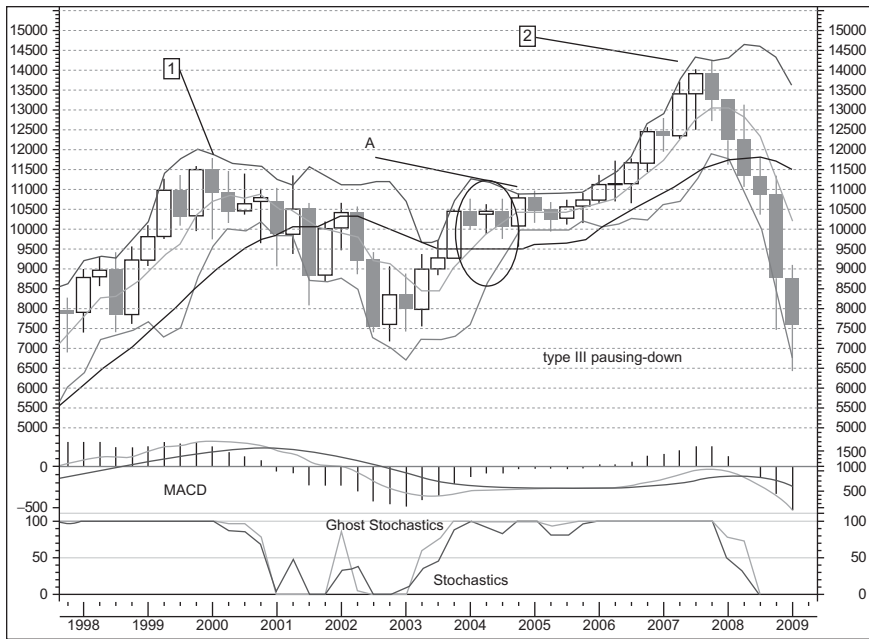
from below, suggesting a two-bar pausing-down in the quarterly interval and further enhancing the robustness of the expectation for a pause-down.

Figure 7.2 illustrates the case of a full type I pause-down following a type II or type III pause-down on the rise to a historical new high. The chart is drawn on quarterly data from the Dow Jones Industrial Average.

At point A on the quarterly time interval chart, there is a 3+2 pausing-down. This is a hidden 1+1 pausing-down, or a type IIc pause-down in the half yearly interval chart after three rising bars. The type IIc pause-down is enough for anticipating a pause-down after the completion of the running thrust.

Additionally, before reaching point A, the quarterly time interval falls by three bars after rising for six bars, marking a type III pausing-down. Therefore, after rising for more than eight bars, the half-yearly time interval is expected to pause down for at least two bars for a full type I pause-down or for a one-year decline at point 2.





**Figure 7.2.** Type III pause-down in the quarterly interval  
*Source:* Data used with permission from eSignal. Graphic used with permission from MetaStock

## 7.2 PAUSES AGAINST TEMPORARY TRENDS

In the last section, the focus is on pausing-downs after reaching a historical new high. In this section, the other two types of pauses are to be considered—pausing-ups without reaching a historical new low and before completing the expected decline; and pausing-downs before reaching a historical new high, with further upside to go. Since the overall uptrend is always maintained and falls from the historical high are always a pause-down in the broad stock market indices, declines never reach a historical new low. Therefore, the discussions about pause-ups on declines almost always apply to the broad market indices.

Examine first the case of pausing-downs before the completion of a temporary uptrend. During the temporary rise, pausing-downs normally occur at resistance levels. The depth of the pausing-downs is

affected mainly by two factors. The first factor is the strength of the resistance. The Bollinger upper band+2 is a stronger resistance point than the Bollinger upper band+1, or other types of resistance levels. The second factor is the remaining upside before the completion of the temporary rise. Normally, after completing more than half of the rise, the market is likely to have longer pauses. Depending on different configurations of the two factors, there are four different possibilities.

**Pause-downs on a temporary uptrend:**

1. The rise has completed half of the expected upside or more, reaching stochastics-B in interval  $t$  and the Bollinger upper band+2 in interval  $t+1$ . Most times, there will be a type II pause-down. If there has been a type II pause-down on the way up, then there will certainly be a type II pause-down after the completion of a wave, quasi-completion of a wave or the completion of other forms of a thrust.
2. The rise has completed half of the expected upside or more, reaching stochastics-B in interval  $t$ , the Bollinger upper band+1 in interval  $t+1$  or resistance level in interval  $t$  or higher order time intervals. Most times, there will be a type I pause-down after the completion of a wave, quasi-completion of a wave or the completion of other forms of a thrust. In case there has been a type II pause-down on the way up, then there is likely a type II pause-down after the completion of a running wave, quasi-completion of a wave or the completion of other forms of a thrust.
3. The rise has not completed half of the expected upside, but has reached stochastics-B in interval  $t$  and the Bollinger upper band+2 in interval  $t+1$ . Most times there will be a type I pausing-down after the completion of a wave, quasi-completion of a wave or other forms of a thrust. But it is possible for the rise to continue without a pause.
4. The rise has not completed half of the expected upside, but reached stochastics-B in interval  $t$ , the Bollinger upper band+1 in interval  $t+1$ , or resistance level in interval  $t$  or high-order time intervals. There may be a type I pause-down; but the rise may continue with no pause at all.

Additionally, the following result is fairly robust (working close to 85 percent of the time).

**MACD + Bollinger upper band+2 rule:** On a temporary uptrend, if the market rises to stochastics-B in interval  $t$  with the MACD histogram still in the negative, while reaching the Bollinger upper band+2 in interval  $t+1$ , a type II pause-down is expected.

The five different conditions and the resulting pauses summarize the normal patterns of the market. There are uncertainties associated with the above normally expected patterns for reasons similar to those in the case of straight pause-ups. Due to the complexity and multitudes of factors similar to those causing a straight pause-up rebound, it is difficult to forecast the duration of the downward pauses on the temporary rise with a high degree of certainty.

However, if there have been type II pause-downs on the way up, then the related statement is fairly robust. The type II pause-downs send a clear signal about the strength of the rebound that will almost certainly be reflected in pause-downs at subsequent pausing points.

Additionally, the speed of the rise is also a factor for evaluating the duration of the downward pauses at resistance levels or Bollinger upper bands. More specifically, if the market rises in time interval  $t$  for four bars before reaching the Bollinger upper band+2 in the interval, then a pause-down is expected.

**Rising by four bars to the Bollinger upper band+2:** On temporary rises before reaching the top-off point, suppose the following conditions are met:

1. Time interval  $t$  rises by eight up-bars ( $t+1$  time interval four bars), or virtual eight bars.
2. Time interval  $t-1$  completes the rising wave if any.
3. Time interval  $t+1$  reaches the Bollinger upper band+2.

then, there is at least a type I pausing-down in time interval  $t$  for two down-bars. Additionally, if more than half of the overall rise has been completed, or there have been type II pause-downs on the way up, then a type II pause-down for four falling bars in interval  $t$  is expected.

While before reaching historical new highs the pauses normally occur at resistance points, there are frequent exceptions. The patterns described in the first section, i.e., downward pauses without resistance, can happen here too before reaching historical new highs. The patterns of the downward pauses without reaching resistance levels in this case are similar to the ones described in section 7.1.

The above discussion describes patterns of downward pauses before completing a temporary rise. The patterns of upward pauses before completing an expected decline are similar, except for one important difference. In analyzing pausing-downs described above, it is necessary to first ascertain whether the rebound is a bottoming-up rebound or just a temporary pause-up before applying the above rules. But when the market falls from a historical new high, it is always a temporary pausing-down. Therefore, the results presented below can be applied without further complications.

Before the completion of a temporary decline, pause-ups most times occur at supporting levels. The duration of the upward pauses is affected mainly by two factors: the strength of the support level and the length of the remaining downside. A Bollinger lower band +2 is a stronger support level than a Bollinger lower band +1 or other supporting levels. Higher time interval supporting levels are stronger than lower time interval supporting levels. In terms of the second factor, normally the pausing-up lasts longer after the decline has completed more than half of the expected fall. Specifically, there are four different possibilities.

#### **Pause-ups on a temporary downtrend:**

1. The fall has completed half of the expected downside, reaching stochastics-A in interval  $t$  and the Bollinger lower band +2 in interval  $t+1$ . Most times, there will be a type II pause-up after the completion of a wave, quasi-completion of a wave or completion of other forms of a downward thrust. If there has been a type II pause-up on the way down, then there will certainly be a type II pause-up.
2. The fall has completed more than half of the expected downside, falling to stochastics-A in interval  $t$ , and reaching interval  $t$  or a higher order time interval support levels or a Bollinger lower band +1 in interval  $t+1$ . Most times, there will be a type I pause-up after the completion of a wave, quasi-completion of a wave or completion of other forms of a thrust. In case there has been a type II pause-up on the way down, then there is likely to be a type II pause-up.
3. The fall has not completed half of the expected downside, but has reached stochastics-A in interval  $t$  and the Bollinger lower band +2 in interval  $t+1$ . In this case, most times there will be a type I pause-up after the completion of a wave, quasi-completion of a wave or completion of other forms of a thrust. But it is possible for the fall to continue without a pause.

4. The fall has not completed half of the expected downside, but has reached stochastics-A in interval  $t$ , and interval  $t$  or a higher order time interval support level or Bollinger lower band+1 in interval  $t+1$ . There will likely be no more than a type I pause-up, and it may have no pause at all.

The following rule also applies.

**MACD + Bollinger lower band+2 rule:** On a temporary downtrend, if the market falls to stochastics-A in interval  $t$  with the MACD histogram still in the positive, while reaching a Bollinger lower band+2 in interval  $t+1$ , a type II pause-up is expected.

The above five cases characterize the normal pattern of the market movement, but with similar uncertainties as mentioned earlier in the case of pausing-downs on a temporary uptrend. But in the case of analyzing a rebound on a decline from a historical high, it is especially important to determine whether the bottom-up point has been reached. Because the fall is from the turning point of a very high-order time interval, any misjudgment by the analyst or variation of the actual pattern from the norm is likely to result in big forecasting errors. The uncertainties mainly come from three sources:

1. Whether the downward pausing point of a high-order time interval has been fully reached.
2. If there are several time intervals that may have reached downward pausing points, which one generated the pause-down? This will determine the duration of the fall.
3. Whether the fall is a full type I pause-down or just a shortened type I pause-down.

Besides pausing-ups at supporting points, the market may also reach rebound points under the following two conditions:

1. Time interval  $t$  falls by eight bars or more, interval  $t$  or interval  $t-1$  completes three falling waves.
2. Time interval  $t$  falls by R9 bars, interval  $t-1$  or interval  $t-2$  completes a falling wave.

However, without reaching a supporting point, especially before the completion of half of the expected fall, temporary rises under the above two conditions are most likely not more than type I pause-ups.

Another likely pausing point is when the market falls slowly by four bars in an interval to reach its Bollinger lower band +2.

**Falling by four bars to a Bollinger lower band+2:** On temporary falls before reaching the bottoming-out point, if the following conditions are met:

1. Time interval  $t$  reaches stochastics-A, or falls by eight bars ( $t+1$  time interval by four bars), or virtual eight bars.
2. Time  $t-1$  completes its falling wave if any.
3. Time interval  $t+1$  reaches the Bollinger lower band +2

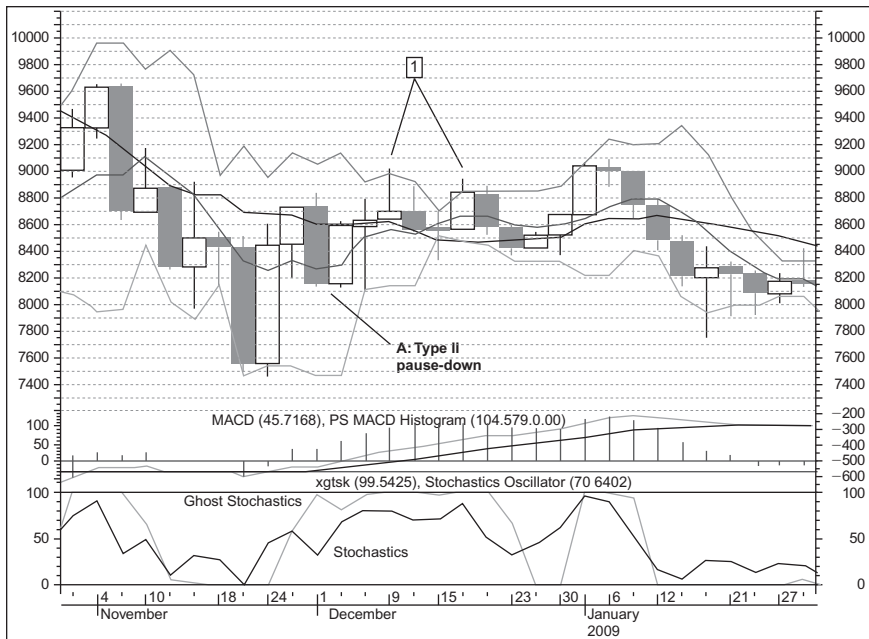
then, there is at least a type I pausing-up in interval  $t$  for two up-bars. Additionally, if more than half of the overall fall has been completed, or there have been type II pause-ups on the way down, then a type II pause-up for four rising bars in interval  $t$  is expected.

Lastly, is a noteworthy case of straight pauses. To illustrate, going back to the case of pause-downs, if the MACD histogram of a time interval turns negative before the fall, the ensuing decline is likely to behave as if it were a topping-off decline. For concreteness, suppose the MACD histogram of time interval  $t$  turns negative while approaching the downward turning point, the subsequent decline is most likely a straight pause-down, at least within the range of four down-bars in time interval  $t$ , i.e., before the uncertainty about the influence in interval  $t+1$  sets in. It should be pointed out, however, that the above statement holds under the assumption that the pause-down would at least last for four down-bars in interval  $t$ . By itself, the MACD histogram does not dictate the duration of the fall.

The above discussion focuses on pauses against temporary trends only. The case for pause-downs against a bottom-up rebound is the same with the exception that type II pause-downs are normally not expected.

Figures 7.3 and 7.4 provide an example of a pause-down at the Bollinger upper band +2. The charts are based on data from the Dow Jones Industrial Average. At point 1, the market rises by six bars in the two-day time interval to ghost-B, reaching the Bollinger upper band +2 in the weekly time interval. A 2+2 pause-down follows.

Figure 7.3 shows the two-day interval chart. The decline at point A is a type II pause-down, falling by one bar after rising for two bars without reaching ghost-B; this is equivalent to falling by two bars after rising for four bars in the daily interval. The market falls for another type II pause-down after rising for six bars to reach the weekly interval Bollinger upper band +2. The pause-down after rising for nine bars



**Figure 7.3** Two-day interval type II pause-down

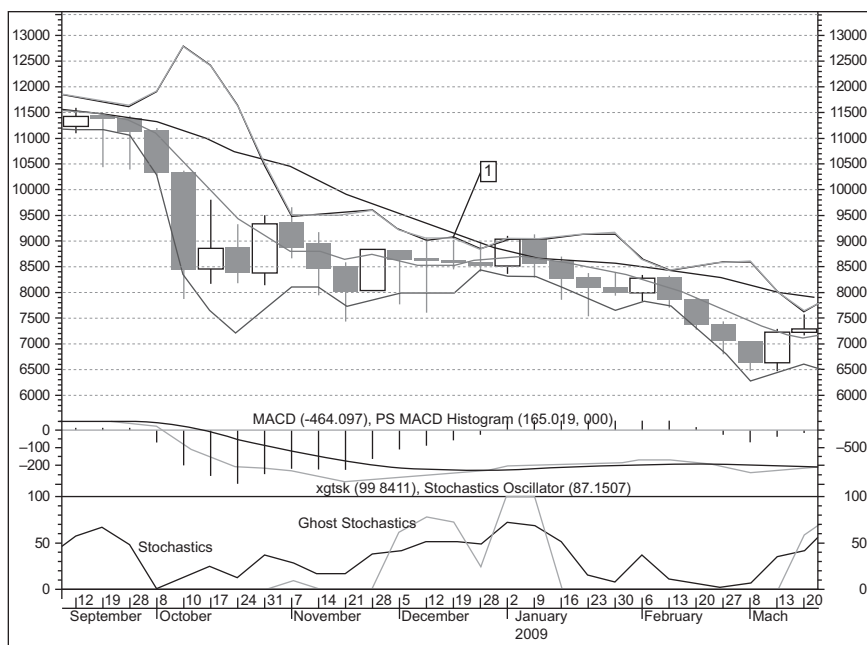
Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

can be viewed with the previous two down-bars as a type IIc pause-down at point 1.

Figure 7.4 (page 152) shows the weekly chart reaching the Bollinger upper band +2 at point 1.

## 7.3 TRADING STRATEGIES FOR PAUSES

Trading on pauses generally comes with more uncertainties than trading on confirmed trend or expected trend reversals. But the trade can still present good profitable opportunities if done with care. The significance of these opportunities can be seen clearly by noting that all the market crashes are temporary pause-downs in terms of the broad market indices. These market crashes have a large impact due to the fact that they are pause-downs at downward pausing points of high-order time intervals such as the yearly time interval or the two-year or even the four-year time interval. A full type I pause-down after R9



**Figure 7.4** Weekly interval Bollinger upper band+2

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

up-bars in the yearly time interval, for example, can last for two years. For this reason, it is clearly not advisable to give up all the opportunities in trading temporary pauses.

However, given the usually strong momentum associated with unfinished trends, especially when the historical high is reached, there are normally higher uncertainties to trade on temporary pauses than on trend reversals. Therefore, it is important to make all the effort to design trading strategies that are the most robust.

Two groups of trading strategies based on expected pauses are highly reliable. The first group involves taking positions in anticipation of a temporary countertrend movement after observing type II or type III pauses. The second group involves taking positions at pausing points with an observed MACD divergence, i.e., with the sign that the MACD histogram is not in sync with the direction of the trend.

First, it is highly robust to trade an expected pause by taking positions against a temporary trend at the next turning point after observing



a type II or type III pause on the way. Suppose on a temporary positive trend, a type II pause-down of four bars in interval  $t$  is observed after eight up-bars. This signals that the rise is temporary. The eight up-bar condition applies if the MACD histogram is in the negative in interval  $t+1$  or the Bollinger band+2 is being reached in interval  $t+2$ . Otherwise, the R9 condition applies. In either case, it is almost certain that there will be at least a full type II pause-down at this downward pausing point in interval  $t+1$ , assuming that there is not enough information to forecast the topping-off. A short position can be taken after the reach of the downward pausing point in anticipation of a type II pause-down of eight bars in interval  $t$ .

How long the short position should be maintained will depend on the trader's trading preference relative to the size of interval  $t$ . In case the decline is only temporary rather than the final topping-off, a type II pause-up is possible on the way down after the short position is taken. If the trader wishes to avoid a four-bar countermovement or more in interval  $k$ ,  $k \leq t-1$ , against the short position, then the position should be closed accordingly after the market reaches eight down-bars or R9 down-bars in interval  $k$ . Otherwise, the position can be held until the market approaches the bottoming-up point at the eighth down-bar in interval  $t$ .

Similar strategies can be employed to take long positions when the market is on the decline, with type II pause-ups on the way down. Suppose a type II pause-up of four bars was observed in interval  $t$  after the market declines for eight bars, then long positions may be taken after reaching eight down-bars or R9 down-bars in interval  $t+1$ . The eight-bar condition applies with the MACD histogram in the positive in interval  $t+1$  or the Bollinger upper band+2 being reached in interval  $t+2$ . Otherwise, the R9 condition applies. The pause-up is expected to last for at least four bars in interval  $t+1$ , but the position needs to be closed before the completion of the pause-up if the trader wishes to avoid four bars or more of countermovement in interval  $k$ , with  $k \leq t-1$ , against the long position. A pause-down of four bars or more may occur after eight up-bars in interval  $k$ .

The strategy rarely fails except in the case of a combo-pause-down or combo-pause-up. In the case of a combo-pause-down, when type II pause-ups occur on the premature falls before the market reaches the high-order downward turning point, the type II pause-ups are not indicative of the nature of the market decline after the high-order market downward turning point is reached. To avoid unexpected large losses from the long position on mistaken information following a

type II rebound, the trade should be aborted if the expected rebound did not materialize after completing the downward thrust and reaching the expected pausing-up point, or if after a brief pausing-up, the market turns down again to signal a topping-off. Similar exit strategies apply when the short position is taken.

The second robust strategy to take positions on a temporary pause is similar to the first strategy, but with the exception that the running trend itself is a result of confirmed trend reversal, rather than just a temporary countermovement against an incomplete trend. Suppose the overall trend is positive after the confirmation of the bottoming-up rebound on a declining trend. If there is a type II pause-down of four bars in interval  $t$  after rising for eight up-bars or R9 up-bars, it is almost certain that there will be at least a full type I pause-down of two bars at the next downward pausing point in interval  $t+1$  after eight up-bars or R9 up-bars. The 3-of-2 rule can be used for the exact entry point to take short positions for the pause-down. The duration of the fall is expected to be two bars after rising for more than eight up-bars or R9 up-bars in interval  $t+1$ . This translates into eight down-bars in interval  $t-1$ .

As the pause-down is only temporary, a type II pause-up is possible on the way down after the short position is taken. If the trader wishes to avoid a four-bar countermovement or more in interval  $k$ ,  $k \leq t-2$ , against the short position, then the position should be closed accordingly after reaching eight down-bars or R9 down-bars in interval  $k$ . Otherwise, the position should be maintained until the market approaches the bottoming-up point before getting out at the eighth down-bar in interval  $t-1$ .

While the second strategy is also fairly robust, there are exceptions too. To avoid unexpected large losses, the short position should be aborted if the market continues to rise after completing the thrust in interval  $t+1$ , according to the 2-of-3 rule, to reach the pausing-up point. A second case that calls for the closing of the short position is when the market falls as expected after the completion of the up thrust in interval  $t+1$ , but then rises to confirm a bottom-up rebound.

A third strategy that takes advantage of expected temporary pauses is to trade on observed MACD signals for countertrend temporary movements. On a rising trend, if the MACD divergence is observed for interval  $t$ , then a short position can be taken on completion of R9 up-bars in the interval in anticipation for a type I pause-down. A second case where a pause-down is expected and a short position can be taken occurs when the market rises to eight up-bars in interval  $t$  with the MACD histogram in the negative. The 2-of-3 rule can be used to

pick the exact entry point. In both cases, a two-bar type I pause-down is almost assured. Furthermore, in the first down-bar in interval  $t$ , only the type I pause-up is expected in lower order intervals. However, a 1+1 pause-down instead of a straight two-bar pause-down is possible. As pointed out in discussing the first two strategies, the short position may need to be closed before the completion of the decline if interval  $t$  is of a high enough order compared with the trader's risk preference.

Conditions 1 and 2 of the "pausing-downs from a historical high" rule are employed to set up the third strategy just described for taking short positions. Similarly, conditions 3 and 4 specified in the same rule can be used to take short positions for equally robust trading strategies. According to the third condition, short positions may be taken if interval  $t+1$  completes a rising wave or rises for  $R9$  bars, with type II or III pausing-downs in interval  $t$  on the way up; a full type I pause-down is expected on completion of the upward thrust in interval  $t+1$ . According to the fourth condition, short positions may be taken if the MA-14 line in interval  $t+2$  breaks the Bollinger lower band from below, if interval  $t+1$  rises for  $R9$  bars or more than eight bars with time interval  $t$  completing three rising waves. A type I pause-down is expected in interval  $t+1$ .



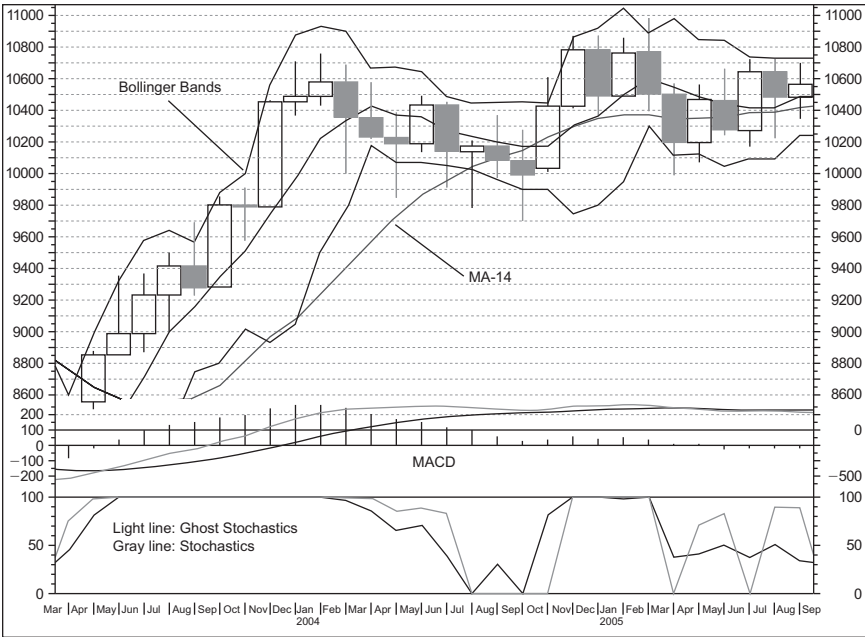
## CHAPTER 8

### Case Studies

This chapter applies the FVITA system and the tools introduced in the previous chapters to analyze market dynamics before and after major market declines in recent history. The reason for choosing recent major market turning points as the cases to be studied is to make the discussion easier to follow. As pointed out earlier, once the user is familiar with the system, FVITA can be easily employed for intra-day trading. However, the experience is likely to be overwhelming at the beginning when multiple time frames and various indicators have to be considered at the same time. It helps if the reader has a general idea about the dynamics of the market during the discussed period. The effectiveness of FVITA is not in any way related to the specifics of the particular market conditions in the selected periods. Neither the frequency of trading opportunities (measured in number of observation points) nor the robustness of the signals is related to the interval sizes or the chosen periods of time. In fact, the system was researched and tested mainly on intra-day charts over the last few years. The fact that it works well with higher time interval charts over a longer period of time serves as an out of sample test and is reassuring.

This chapter will examine the main market indices in three different markets: the Dow Jones Industrial Average Index (DJIA) in the US, the Tokyo Stock Price Index (Topix) in Japan and the Shanghai Composite Index in China.

Figure 8.1 marks out the technical indicators used in the charts of this chapter. The same indicators will be used in all the charts. The chart is drawn with data from the Dow Jones Industrial Average.



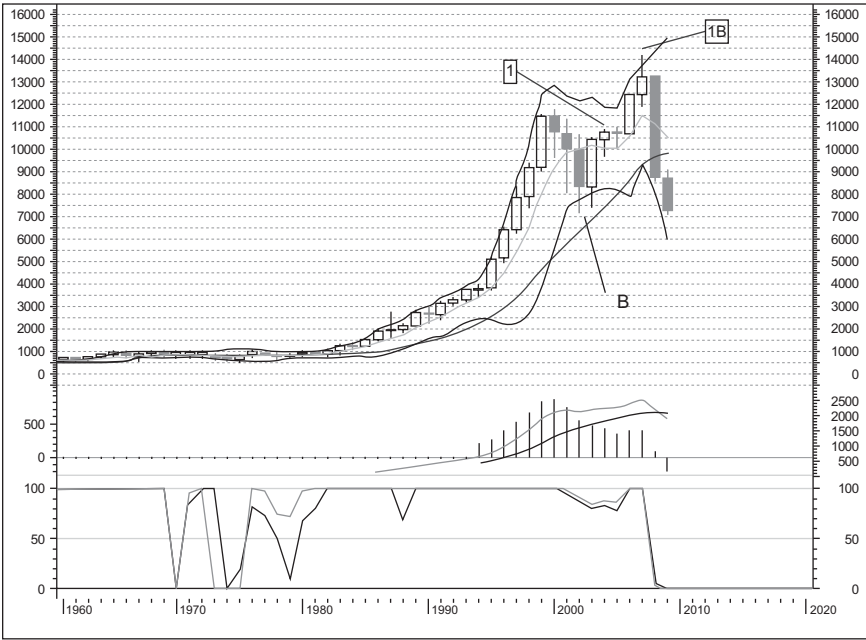
**Figure 8.1** Indicators used in the charts

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

## 8.1 CASE 1: THE 2007 FINANCIAL MARKET CRISIS—DJIA

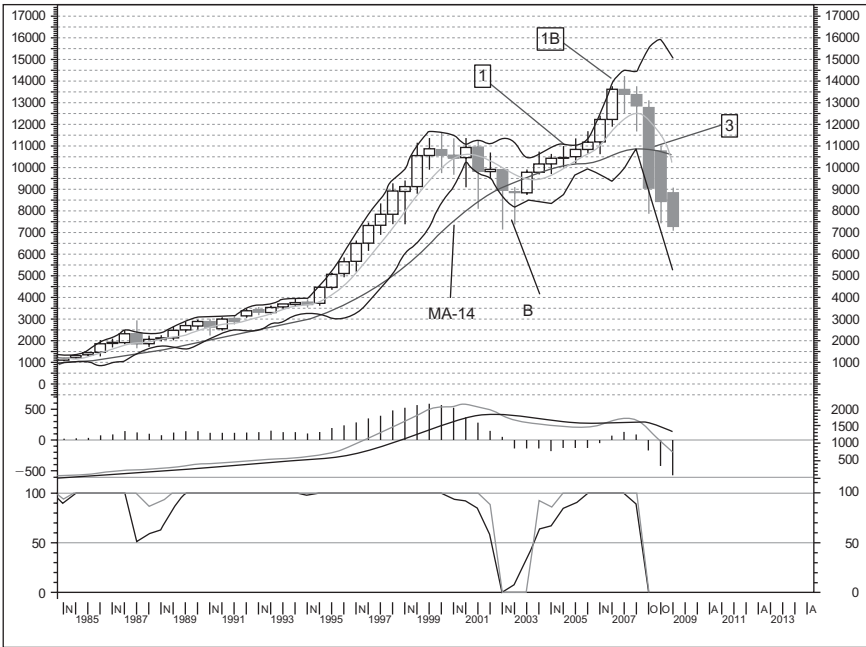
The following discussion is based on Figures 8.2 to 8.5, displaying the yearly interval chart, half-year interval chart, quarterly interval chart and monthly interval chart, respectively. It demonstrates how FVITA can be used to anticipate the timing of a major decline, the possible depth of the decline, and the size of countermovements on the fall.

1. The stock market started to fall in November 2007 at point 1B of figures 8.2 and 8.3. The fall was well anticipated by the chart patterns ahead of the decline, as detailed below.
2. After the high-tech bubble burst in 2000, the market fell by seven bars at point A in the quarterly time interval chart (figure 8.4), then rose by two bars before falling to a new low and entering into the bear market of the quarterly time interval+2, i.e., the yearly time interval. The market bottomed up at the end of 2002 at point B on the charts.



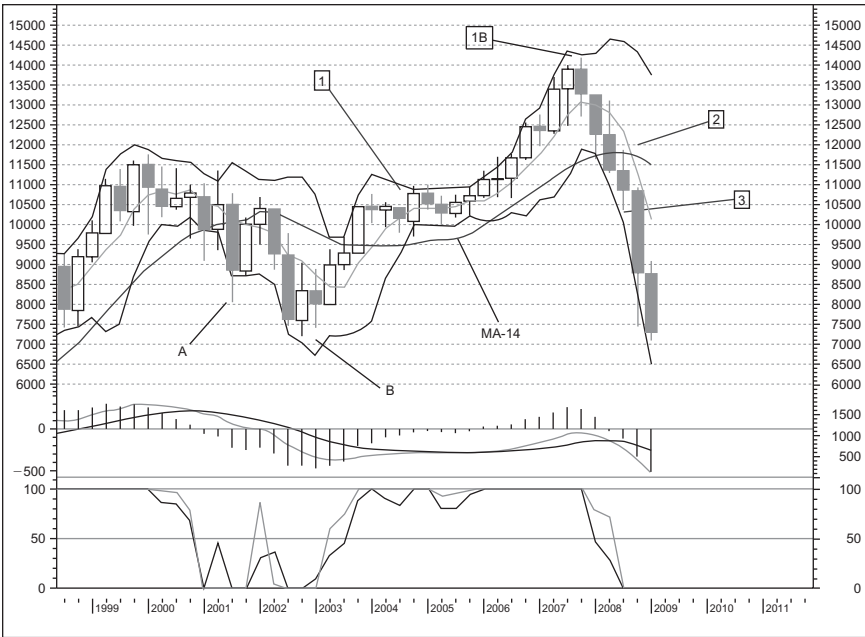
**Figure 8.2** Yearly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.3** Half-year time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



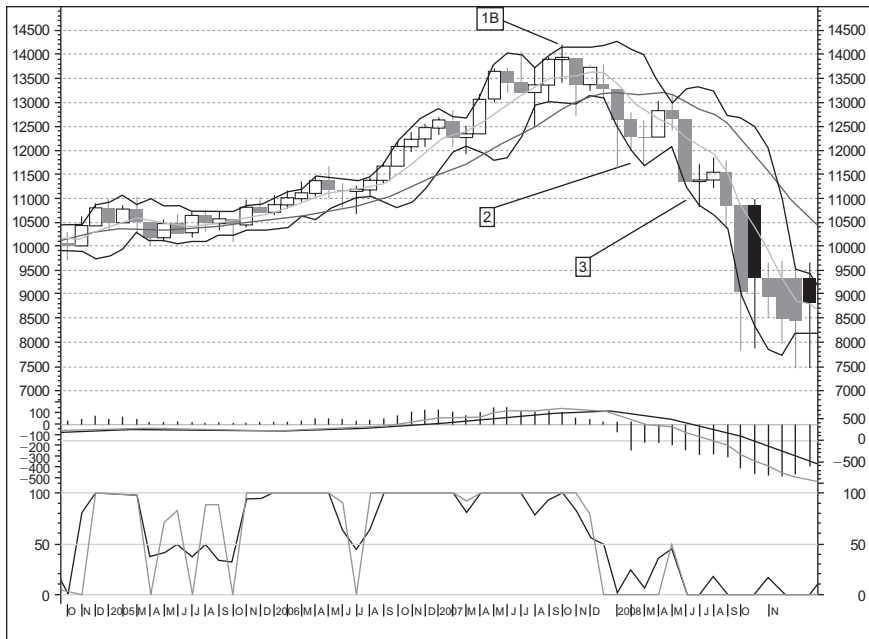
**Figure 8.4** Quarterly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

3. The pause-up at point A occurred under the 2-of-3 rule. There were irregular, but clear waves on the way down. At point A, a monthly wave of two bars was completed (figure 8.5). Although the Bollinger lower band in the half yearly interval (figure 8.3) was broken and not qualified as a supporting point, a supporting point was furnished by the MA-14 line. The MA-14 line normally is not a strong supporting point, but can be combined with completed waves to satisfy the conditions required by the 2-of-3 rule to produce a pausing-up or rebounding point. (Rule: 2-of-3 rule.)

At point B, the half yearly time interval fell by quasi-eight bars, declining by seven bars while reaching a yearly interval Bollinger lower band+2. At least a two-bar type I pausing-up in the half yearly interval could be expected. But most likely the pause-up should last for four bars in the half yearly interval for a type II pause-up of two years, in case further decline





**Figure 8.5** Monthly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

was expected. (Rule: Pause-up on a temporary fall.) But in fact, the market bottomed up at point B.

4. At point 1, after rising for eight bars in the quarterly time interval, the market fell by two bars before rebounding to a new high, therefore turning the yearly time interval (figure 8.2) from the bear market to the bull market. This confirmed the bottom-up and the completion of the decline after the bursting of the tech bubble. (Rule: Bottoming-out on a pause-down.)
5. Because the bottom-up occurred after the yearly chart fell by three bars, the next significant pausing point was expected to be either after completing the next upwave in the yearly chart or after completing the running thrust of a higher order time interval.

At point 1B, the market rose by eight bars in the half yearly time interval, and completed the second upwave after a hidden 1+1 downward pause (a 3+2 pausing-down in the quarterly time interval). During the second wave, the market displayed

a weakening upward momentum, forming three rising waves in the monthly time interval, with the third monthly wave consisting of two waves. This sent a clear signal that there would likely be a type II or 2+2 pausing-down in the half yearly time interval or a type I pausing-down in the yearly or higher order time interval. (Rule: Pausing-downs from a historical high.)

Additionally, at point 1B, the half yearly time interval displayed MACD divergence, further confirming the expected fall. (Rule: Pausing-downs from historical high.) A third signal for the anticipated fall came in the form of the MA-14 line breaking from below the Bollinger lower band in the yearly interval while the half yearly time interval rose by eight bars to complete the second upwave. (Rule: Pausing-downs from a historical high.)

6. In fact, there were clear signals for a type II pausing-down at point 1B in the yearly time interval for a two-year decline. After the bottom-up rebound at point B, the market displayed a pausing-down at point 1 with a long enough duration to indicate another pausing-down to follow. While the hidden 1+1 pausing-down in the half yearly interval was a type IIc pause-down rather than a clear-cut type II pause-down, the three falling bars following the five rising bars in the quarterly time interval signaled clearly a type III pausing-down. As a result, a type II pausing-down in the half yearly time interval for a total of four bars, or two years, was anticipated. It is possible, however, for the two-year time interval to display a two-bar type I pausing-down for four years.
7. With the total decline expected to be more than four bars in the half yearly interval, and on the MACD divergence after rising by more than eight bars in the interval, the fall of the first two bars was fast, straight declines with only type I pause-ups on the way down for the duration of one year, or two bars in the half yearly interval. (Rule: Pausing-downs from a historical high.) To be exact, at point 2, the rise was marginally stronger than a type I pause-up; the rebound at point 3 was exactly a type I pause-up.

## 8.2 CASE 2: THE 2000 HIGH-TECH BUBBLE AND ITS AFTERMATH—DJIA

While the stock market crash in 2007 was preceded by strong anticipatory signals, the fall after the bursting of the high-tech bubble in 2000 was hard to predict both in terms of the timing and the duration of

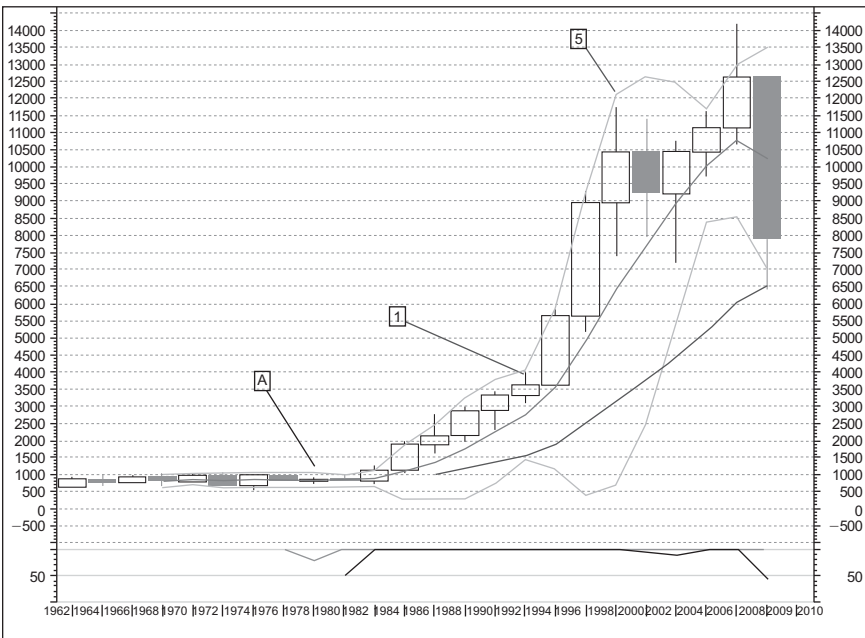
the decline. The path of the fall was also met with robust support at pausing-up points, reflecting considerable divergence in market views about the full economic implication of the information revolution—whether it has been fully reflected in the valuations of stock prices and whether the market exuberance is justified.

### 8.2.1 The Formation of the High-Tech Bubble—DJIA

The following analysis examines the formation of the high-tech bubble. The discussion is based on figures 8.6 to 8.10, showing the two-year time interval chart, the yearly time interval chart, the half-year time interval chart, the quarterly time interval chart, and the monthly time interval chart respectively.

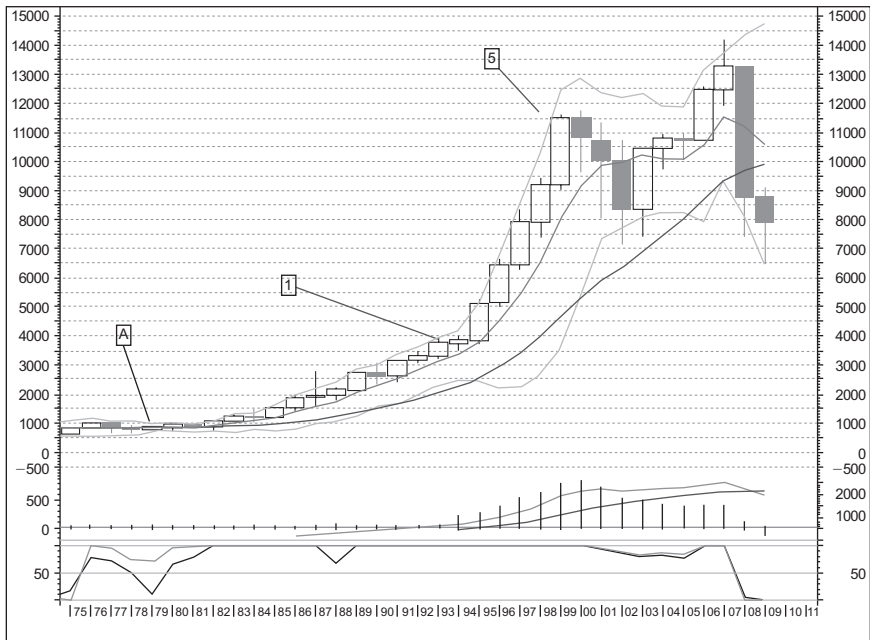
1. At point 1, the market fell by two hidden bars in the half yearly time interval (figure 8.8), or by 2+1 bars in the quarterly time interval (figure 8.9) before rising to a new high. At point 2, the quarterly MA-14 line rose to break the Bollinger lower band from below. As a result, the market fell by 1+1 bars for a type Ic pause-down in the monthly time interval (figure 8.10). (Rule: Pausing-downs from historical high.)
2. At point 3, after the MA-14 line in the half yearly time interval rose to break the Bollinger lower band from below, the market fell by four bars in the monthly time interval, and by hidden two bars in the quarterly time interval, as expected. (Rule: Pausing-downs from historical high.)
3. At point 4, the half yearly time interval rose by eight bars from point 1. The quarterly time interval fell by 1+1 bars, followed by the completion of a third rising wave at point 5 for a total rise of 11 bars. (R9 up-bars not shown.)
4. At point 5, the MA-14 line in the two-year time interval and the yearly time interval (figure 8.7) rose to break the Bollinger lower bands from below. At the same time, the two-year time interval (figure 8.6) and the half-yearly time interval both rose by 11 bars (R9 up-bars, not shown). There was not enough data to judge whether the MA-14 line in the four-year time interval broke the Bollinger lower band from below. Therefore, only a two-bar decline in the half yearly time interval could be anticipated with a high degree of confidence. A one- or two-bar decline in the two-year time interval was likely, but with some uncertainty. (Rule: Pausing-downs from historical high.)

5. At point 5, after rising by R9 up-bars in the two-year time interval, the market may start to fall by one or two bars in the time interval at any time. Therefore, no long position should be taken towards the completion of lower order interval upwaves.
6. The market fell by three bars from point 5 in the yearly time interval, and then bottomed up. The interest rate cuts by the Federal Reserve, to be detailed below, were apparently responsible for the early rebound after three falling bars instead of four falling bars. The upward volatility along the path of the decline also suggests continued market anticipation of a further upside. Bubble or not, the boost to the economy from the information revolution was still judged by many people to have not completed its course. The early rebound provided a good example that real-time economic policies and unexpected events may alter the path of the market at the margin, prompting earlier or later changes of the trend than otherwise anticipated. The impact of these economic policies and unexpected events will be especially potent when supported with strong forces in the market place in the same direction.



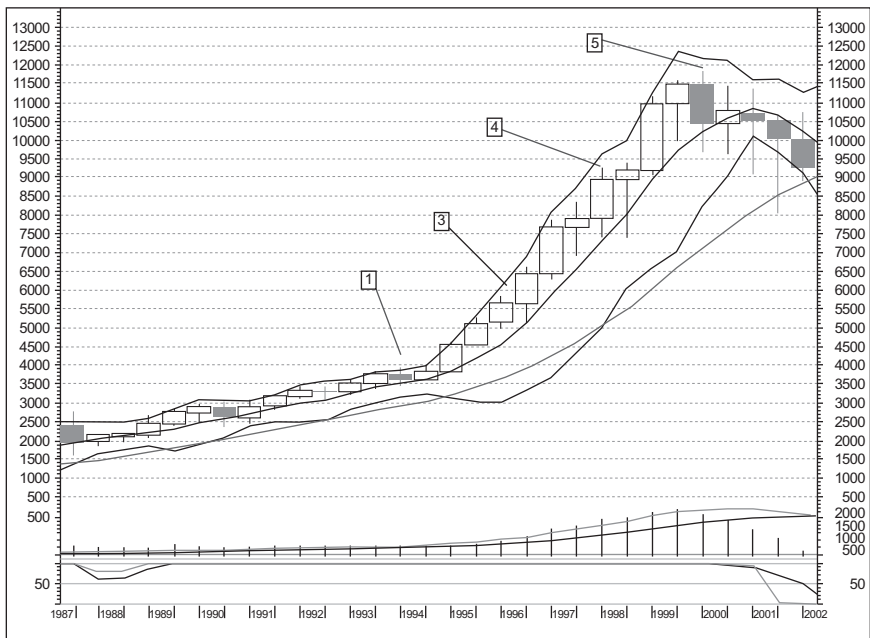
**Figure 8.6** Two-year time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



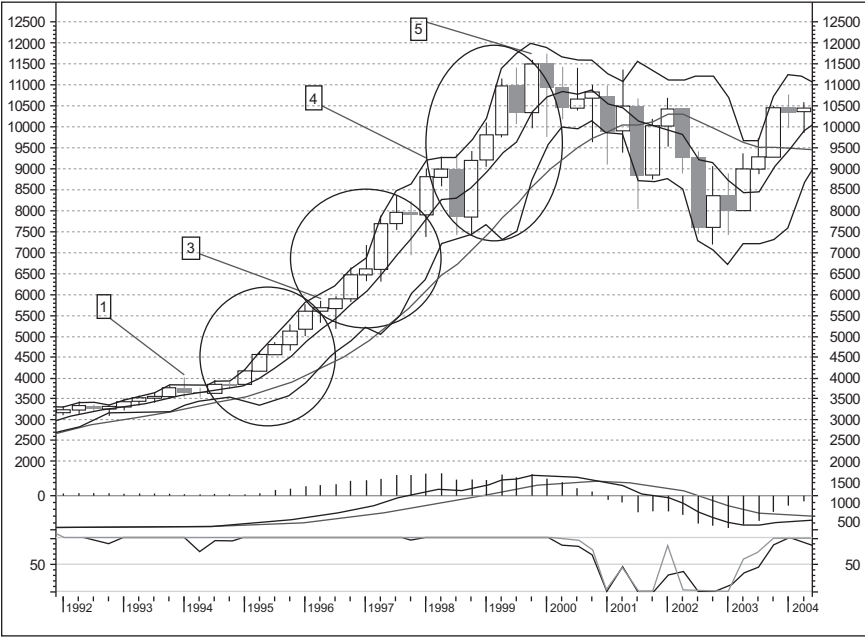
**Figure 8.7** One-year time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



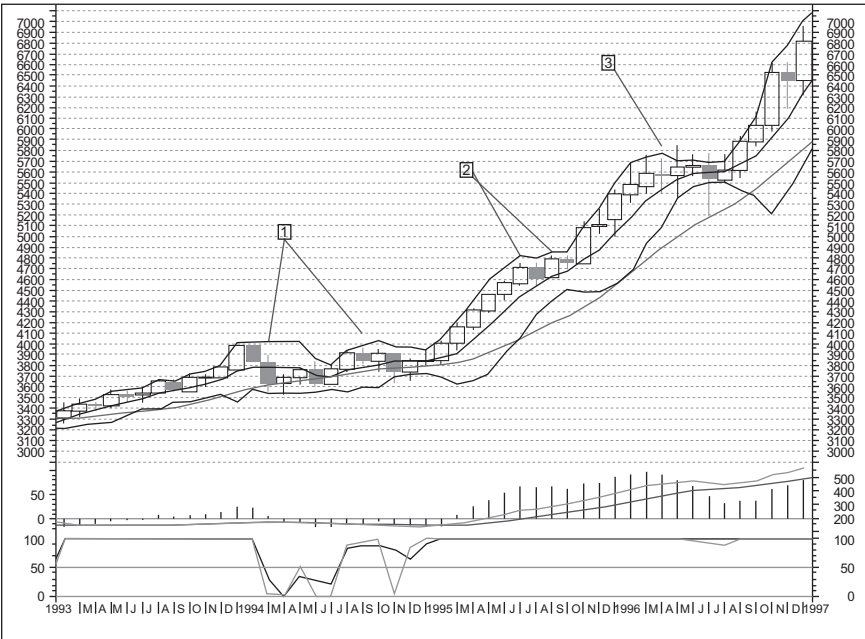
**Figure 8.8** Half-year time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.9** Quarterly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.10** Monthly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

### 8.2.2 The Bursting of the High-Tech Bubble—DJIA

The following analysis examines the bursting of the high-tech bubble. The discussion is based on figures 8.6 and 8.7 as shown before and on figures 8.11 to 8.16 displayed in the following, showing the half-year time interval chart; the quarterly time interval chart; the monthly time interval chart; the two-week time interval charts, and the weekly time interval chart respectively.

1. At point 5, the two-year time interval (figure 8.6) and the half-year time interval (figure 8.11) both rose by 11 bars (R9 up-bars, not shown). The MA-14 line in the monthly time interval (figure 8.13) rose to break the Bollinger lower band from below. After the quarterly time interval (figure 8.12) completed the rising wave (somewhat irregularly), conditions for the 2-of-3 rule were satisfied and pausing-down was expected. (Rule: Pausing-downs from historical high.)

The market fell before rising by eight bars in the monthly interval. When the high-order time interval approaches pausing points, the lower order time interval may fall before completing rising waves or before rising by more than eight bars in total, although further rises to completing the upwave is still possible. However, when 2-of-3 rule conditions are satisfied with high-order conditions, the fall will occur before lower order intervals complete upwaves. (Rule: 2-of-3 rule.)

2. At point 6, the market reached monthly time interval stochastics-A and rebounded at the quarterly time interval Bollinger lower band+2. (Rule: Pause-up on a temporary downtrend.)
3. At point 7, the two-week time interval (figure 8.14) rose to virtual eight bars with the MACD histogram remaining negative. The monthly time interval rose by six bars with a type III pause-down on the way, to ghost stochastics-A with the MACD histogram in the negative. The market was expected to top off. (Rules: Cap after type III pausing-down; the six-bar rule in temporary pausing-up.)
4. The pause at point 8 was expected. Because after falling at point 7, the market displayed a type II pause-up (in the monthly time interval), the market was expected to have at least a type I and most likely a type II pause-up after reaching quarterly time interval stochastics-A and half yearly time interval Bollinger lower band, completing lower time interval falling waves. (Rule: Pause-up on a temporary downtrend.)

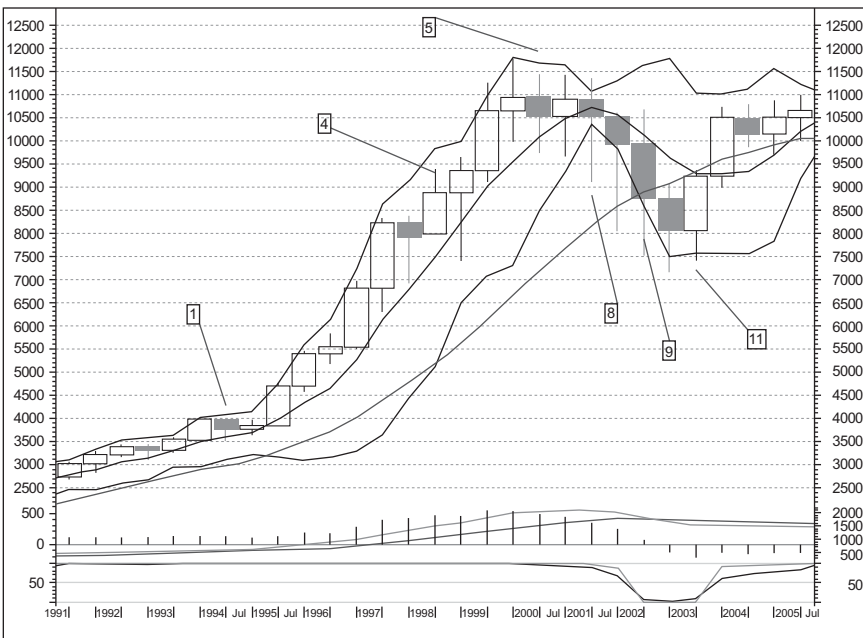
Consistent with expectation, the pause-up at point 8 was a type II pause-up because it reached virtual eight bars in the two-week time interval, although the market rose only by two bars in the monthly time interval.

5. The market rebounded at point 8 to two up-bars in the monthly time interval before falling to a new low at point 9. The half-yearly time interval entered the bear market. (Rule: Bear market signals.)
6. After rebounding to eight rising bars in the two-week interval (figure 8.15), the market fell by two bars in the interval before rising to a new high, turning the quarterly time interval into the bull market. But the half-yearly time interval remained in the bear market. With the two-week time interval displaying 2+2, type IIc pause-down at point 9A, the top-off is expected after completing the next thrust up to reach the bear market cap, on forecasting of the incomplete decline and supported by the IIc pause-down on the way up.
7. After the two-week time interval displayed a 2+2, type IIc pause-down at point 9A, the market topped off at point 10, where the monthly time interval reached stochastics-B with the MACD histogram in the negative after rising for six bars. Because the yearly time interval was still in the bear market with the overall decline incomplete, the top-off occurred after rising for six bars with a hidden 1+1, type IIc pause-down on the way up, instead of eight bars. The exact timing of the fall was given by the completion of the two-bar wave after the hidden 1+1 pause-down in the monthly time interval. (Rule: The six-bar rule in temporary pausing-up.)
8. After falling by eight bars to point 10A, the weekly time interval (figure 8.16) rose by virtual two bars (the daily time interval rose by virtual eight bars), before the market declined to reach a new low at point 10B. The monthly time interval turned into the bear market from the bull market, confirming the top-off. (Rule: The topping-off rule.)
9. At point 11, after falling by six bars to reach stochastics-A in the half yearly time interval, the market bottomed up at the Bollinger lower band +2 in the yearly time interval. The bottom-up forecast was difficult to make, purely on technical grounds in this case. While a variation of the six-bar rule might explain the early rebound, the actual forecast had to be based on combined macroeconomic analysis and technical analysis. The Federal Reserve's aggressive interest rate cuts and the still



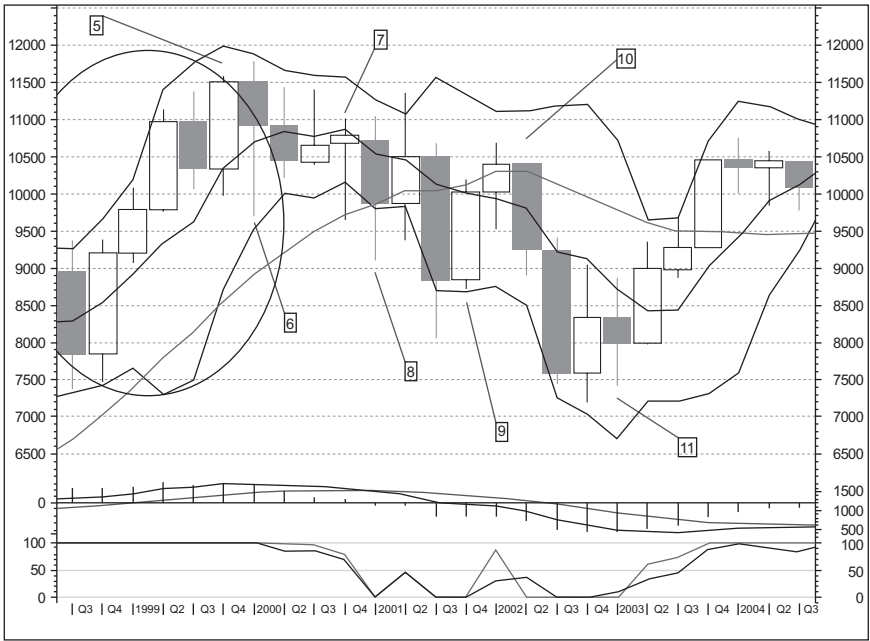
thick market belief for further support to economic growth from the information technology revolution jointly lifted the market for an early rebound.

The Federal Reserve started the aggressive interest rate cuts from January 3, 2001 by reducing the targeted federal funds rate by 50 basis points from 6.5 percent, followed with four consecutive rate cuts of 50 basis points each on January 31, March 20, April 18 and May 15 of the same year, reducing the targeted rate to 4 percent. After slowing the pace of adding liquidity to the economy with a 25 basis point cut each on June 27 and August 21 of the same year, the Federal Reserve was alarmed by the continued weakening of the economy and went back to aggressive easing with three more 50 basis point cuts on September 17, October 2 and November 6, ending the year with a 25 basis point cut on December 11. It would make two more cuts, 50 basis points on November 6, 2002 and 25 basis points on June 25, 2003 to reduce the targeted federal funds rate to 1 percent before the monetary easing came to an end.



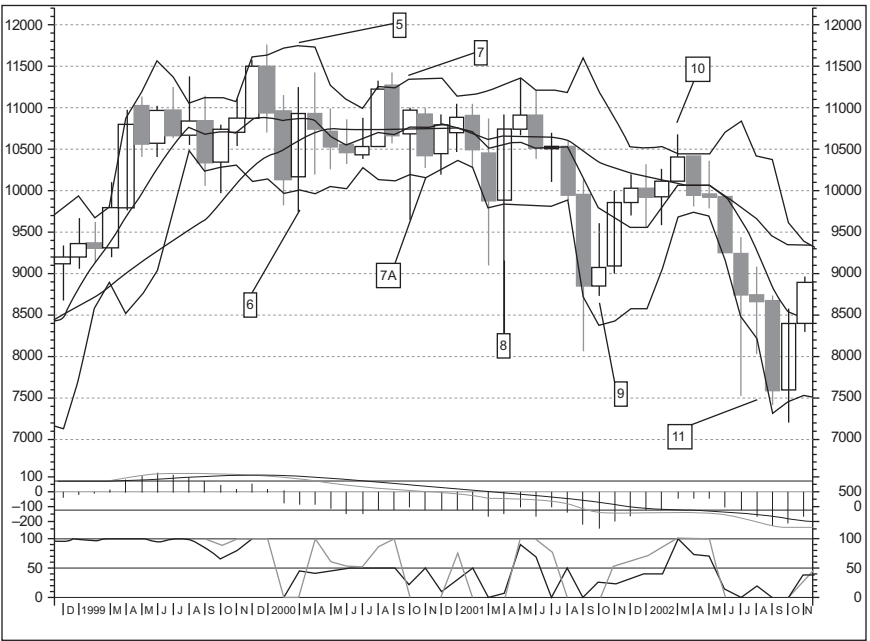
**Figure 8.11** Half-year time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



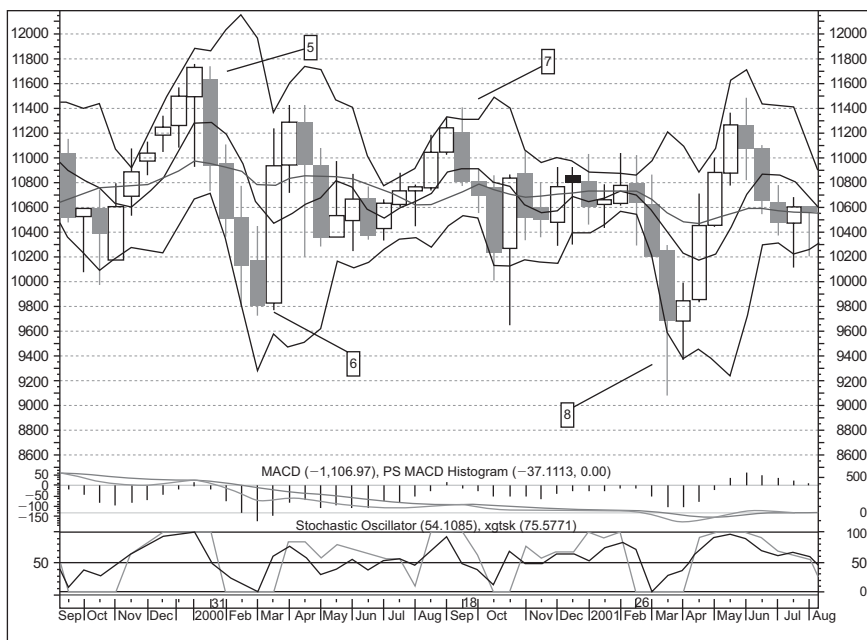
**Figure 8.12** Quarterly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



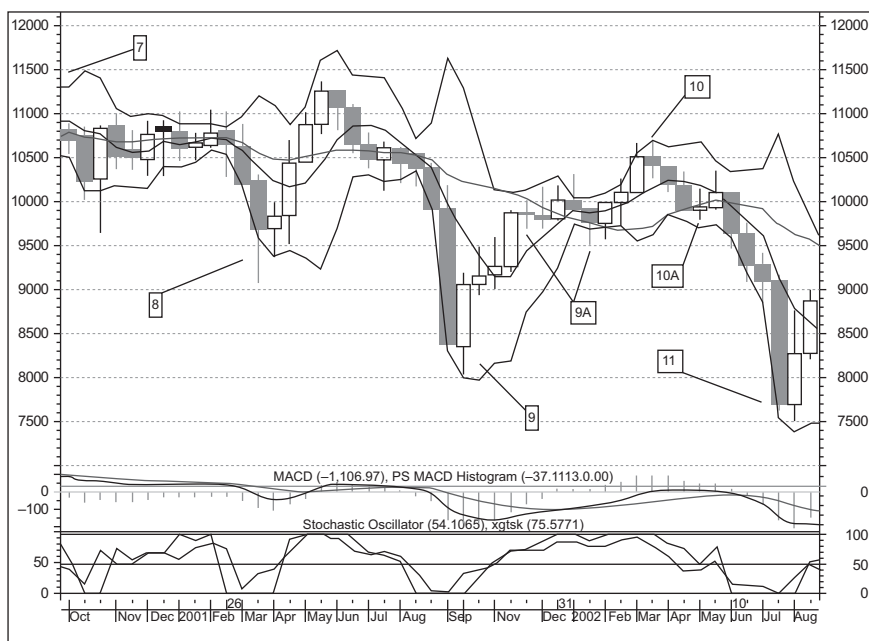
**Figure 8.13** Monthly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



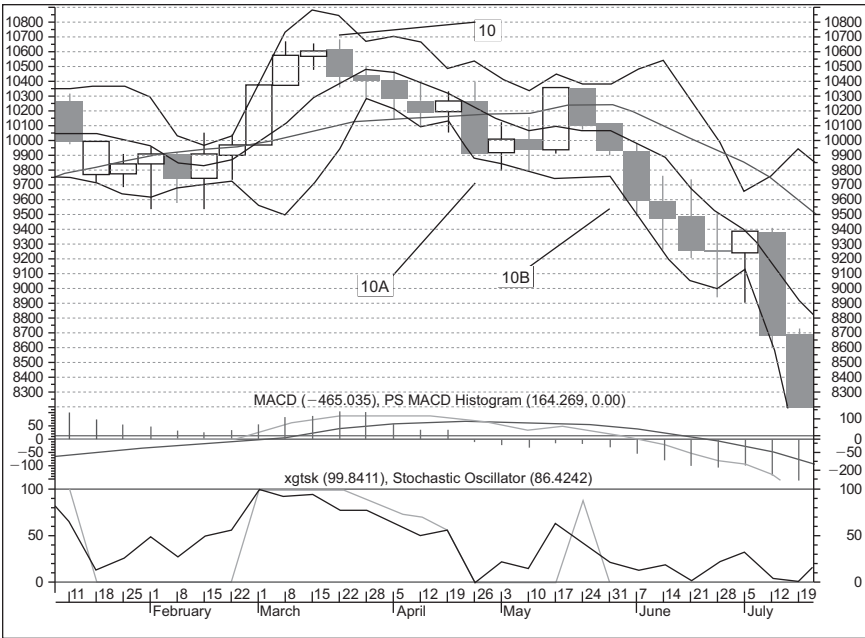
**Figure 8.14** Two-week time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.15** Second two-week time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock.



**Figure 8.16** Weekly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

## 8.3 CASE 3: THE 1990 BUBBLE AND FALL—TOPIX

In the following, the bubble that burst in Japan's Topix in 1990 is examined in three phases: the formation of the bubble and the two stages of decline after the bursting of the bubble.

### 8.3.1 The Formation of the 1990 Bubble—Topix

The formation of the bubble is analyzed using figures 8.17 to 8.21, showing the two-year time interval chart, the yearly time interval chart, the half-year time interval chart, the quarterly time interval chart, and the monthly time interval chart respectively.

1. At point 4, the monthly time interval (figure 8.21) rose for three waves from point 3 with two pause-downs of one bar each in the quarterly time interval (figure 8.20). The quarterly time interval rose for more than eight bars, the MA-14 line in the

half-yearly time interval (figure 8.19) rose to break the Bollinger lower band from below. A type I pause-down was expected for two bars in the quarterly time interval. (Rule: Pausing-downs from historical high.) But the quarterly time interval did not fall by a full type I pause-down, continuing the rise after a hidden one-bar pause-down. (Rule: The halfway rule.)

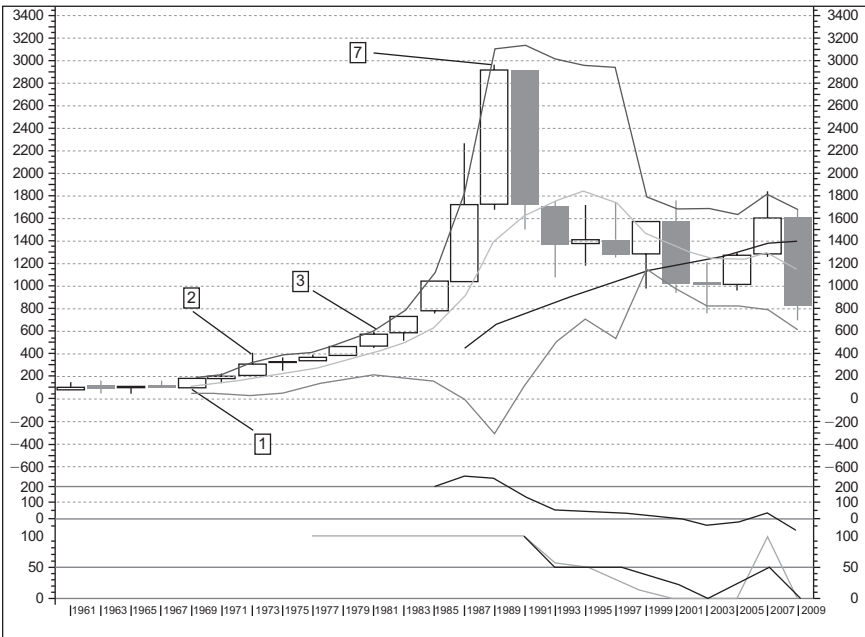
When the market is rising strongly before the completion of a high-order upside, the pause-down of lower order time intervals may often be shortened. Therefore, before the completion of a higher order time interval upside with strong rising momentum, extra caution is required when acting on countertrend signals from lower order time intervals. A short position should be avoided after the completion of half of the expected temporary decline.

2. At point 5, the market rose for 10 bars (R9 up-bars, not shown) from point 3 in the half-yearly time interval. The yearly time interval (figure 8.18) broke the Bollinger lower band from below; a two-bar pause-down in the half-yearly time interval, denoted by *t*, was expected (Rule: Pausing-downs from historical high.) Consistent with the expectation, a pause-down followed that lasted for quasi-eight bars in the *t*-2 time interval, i.e., the monthly time interval.
3. At point 6, the monthly time interval rose by quasi-eight bars with the MACD histogram still in the negative. As expected, a pause-down of hidden two bars followed. (Rule: Pause-downs on a temporary uptrend.)
4. At point 7, the two-year time interval (figure 8.17) rose for 11 bars (R9 up-bars, not shown) from point 1, the monthly time interval completed three upwaves after bottoming-up from point 5A. A type I, two-bar pause-down of four years in the two-year time interval would normally be expected. (Rule: Pausing-downs from historical high.)

Technically speaking, a bottom-up rebound is possible after halfway is completed on the type I pause-down. (Rule: Halfway rule.) But this would have implied further rises to the completion of the four-year interval thrust, or another R9 up-bars in the two-year interval for two more decades before the running bubble burst. Some basic knowledge about the macro conditions in Japan at the time would suggest that such a scenario was not possible. Not surprisingly, the market started a decline that lasted for more than a decade.

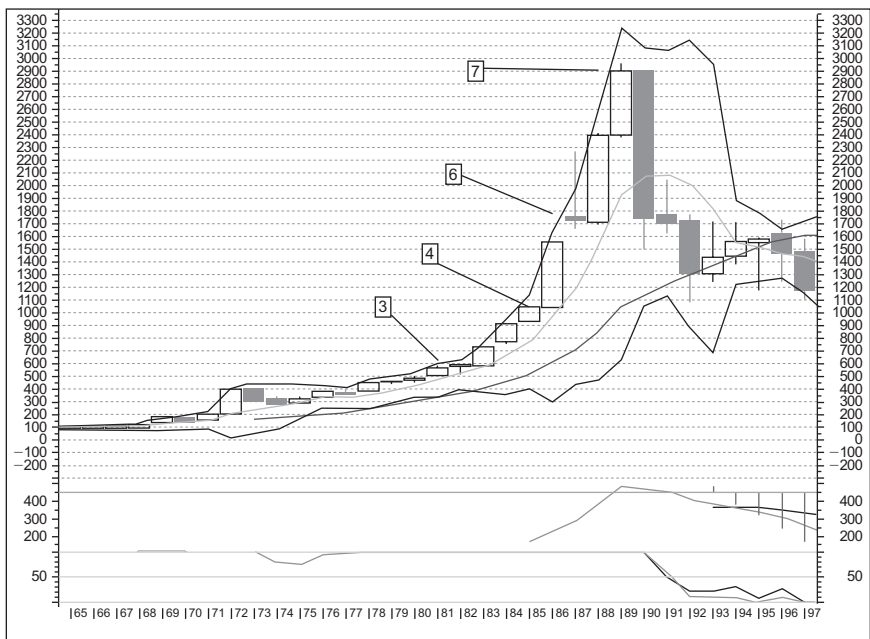
5. It should be noted that at point 7, the MACD lines in the monthly time interval remained below that reached at point 5, indicating the upside momentum was weak after the bottom-up rebound at point 5A. Signals generated by lower order time intervals should not be used to evaluate the trend of higher order time intervals. However, if combined with signals of a higher order time interval pausing point, signals from lower order time intervals can be used to determine the timing of the pause-down.

More specifically, at point 7, due to MACD divergence and the completion of three rising waves in the monthly time interval, a type I pause-down in the interval for two months could be expected with a high degree of confidence. But with the two-year time interval reaching its downward pausing point at point 7, the pausing point of the monthly time interval initiated the fall in the two-year time interval. (Rule: 2-of-3 rule.)



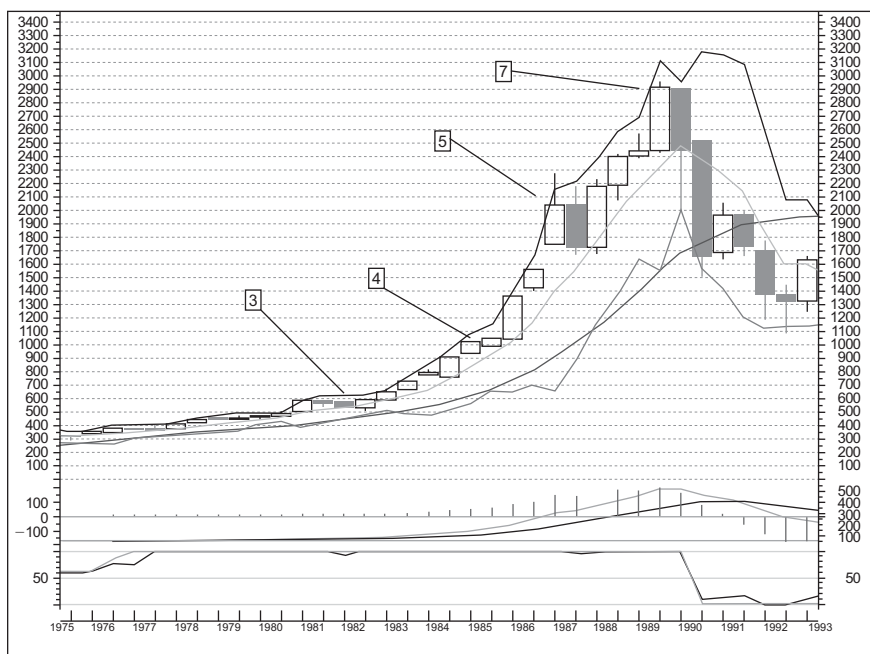
**Figure 8.17** Two-year time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



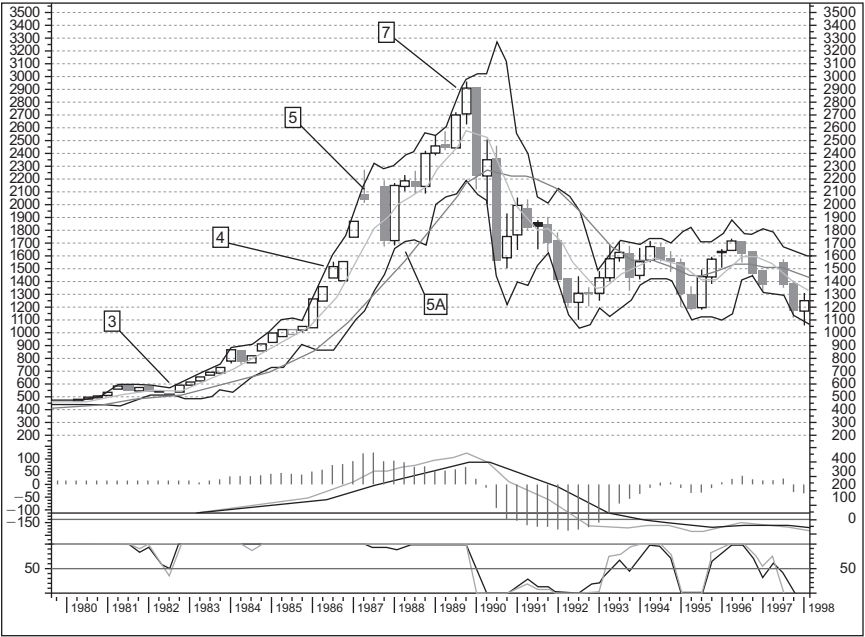
**Figure 8.18** Yearly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

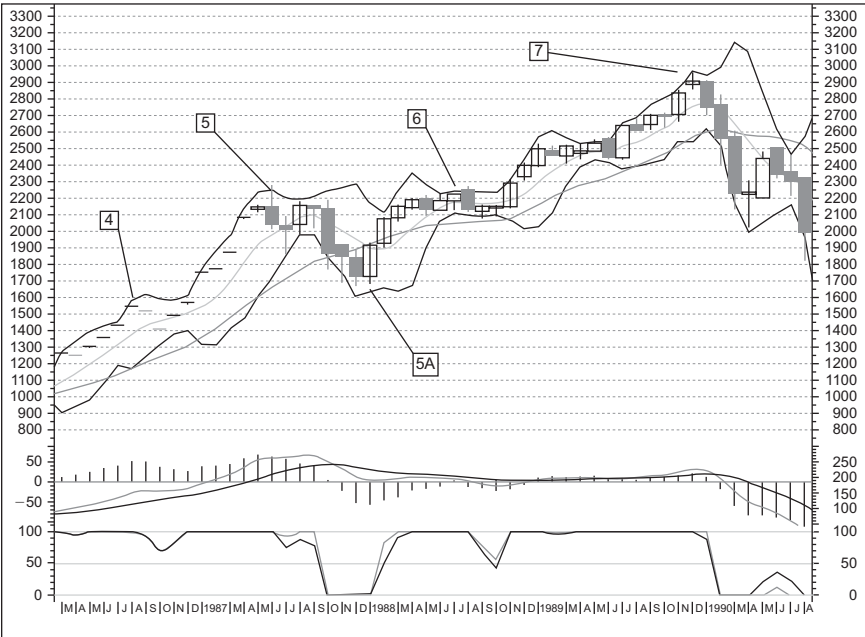


**Figure 8.19** Half-year time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.20** Quarterly time interval chart  
 Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.21** Monthly time interval chart  
 Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



### 8.3.2 The Bursting of the Bubble in 1990, I—Topix

The analysis of the first phase of the decline following the bursting of the bubble in 1990 is based on figures 8.22 to 8.28. These figures show the quarterly time interval chart, the monthly time interval chart, the two-week time interval chart, the weekly time interval chart, the two-day time interval chart, the daily time interval chart, and the second daily time interval chart respectively.

1. After falling from point 7, the two-day time interval (figure 8.26) reached ghost stochastics-A at point 7A, with the price line remaining above the MA-14 line and the MACD histogram staying positive. Therefore, the market rebounded at the Bollinger lower band+2 in the weekly time interval (figure 8.25) for a type II rebound; while the rebound was just for two bars in the daily interval (figure 8.27), it reached daily ghost stochastics-B. (Rules: Pause-ups on a temporary downtrend; MACD + Bollinger lower band+2 rule.) Normally, the market is expected to rebound at time interval  $t+1$  Bollinger lower band+2 with time interval  $t$  reaching stochastics-A and the MACD histogram being in the positive. The fact that the price line in time interval  $t$ , i.e., the two-day time interval, stayed above the MA-14 line further increased the chance of a rebound.
2. After rebounding at point 7A, the MACD histogram in the two-day time interval turned negative at point A, sending the interval into the bear market (Rule: Bear market.) Therefore, the market fell with the daily time interval (two-day interval-1) reaching ghost stochastics-B and the MACD histogram remaining negative. (Rule: The bear market cap rule.)
3. At point 8A, the weekly time interval fell by five bars to reach stochastics-A and the market rebounded for a type II pause-up at the Bollinger lower band +2 in the two-week time interval (figure 8.24). (Rule: Pause-ups on a temporary downtrend.)

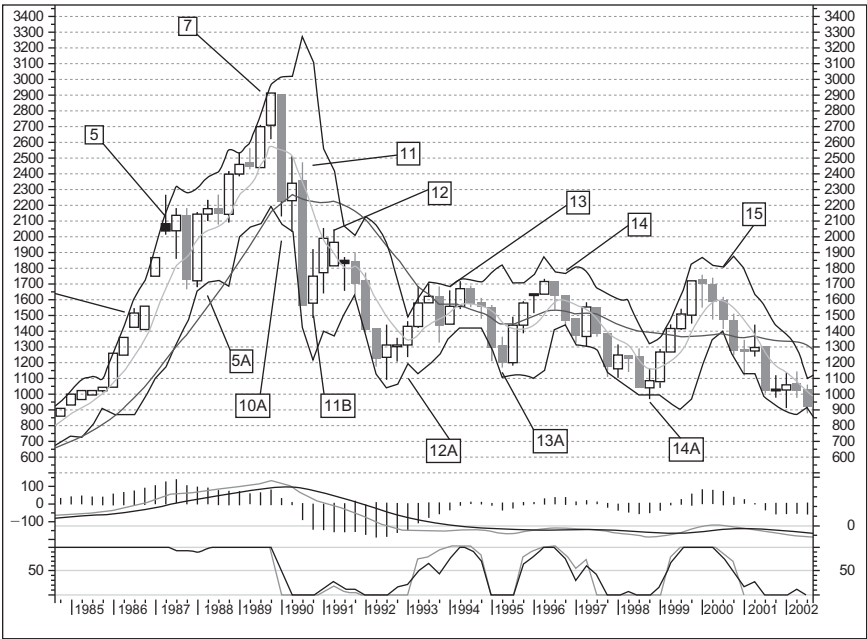
At point 8A, the weekly time interval fell by five bars to enter into the bear market. (Rule: Bear market signals.) The bear market could also be confirmed from a different perspective. The daily time interval rose for two bars after reaching virtual eight bars at point 7A, then fell to a new low, also signaling that the weekly time interval turned into the bear market. (Rule: Bear market signals.)

4. The daily time interval rose from point 8A to reach point 9 after a 2+2 type II pause-down on the way up, with the first two-bar pausing-down a type II pausing-down. Alternatively, the rise might be viewed as starting from point 8B, pausing-down for two bars after going up for 3 bars, before resuming the rise to reach point 9; again a type II pausing-down was displayed. Either way, there was a type II pause-down on the way up. Therefore, the rebound was only temporary. (Rule: Signals of a pausing-up.) Because the weekly time interval was in the bear market, the market topped off after reaching ghost stochastics-B in the two-day time interval with the MACD histogram remaining negative. (Rule: Bear market cap rule.)
5. The market rose from the support level at point 9A (figure 8.25). On the way up, the market declined for a non-standard type III pause-down at point 10 (figure 8.28), falling for three bars after rising by four bars in the daily interval. The top-off came after the daily time interval rose to more than eight bars to reach just below an earlier high. (Rule: Cap after a type III pausing-down.)

The type III pausing-down could not be confirmed by the standard criterion; making a decision based just on the signal would have involved some uncertainty and risk. But a type II pause-down was clear from the two-day interval chart, with a one-bar decline following a two-bar rise. This reduced the risk by affirming the rebound as a temporary rebound and forecasting a pause-down of four bars in the daily interval after rising for a total of eight bars, or four bars in the two-day interval at the Bollinger upper band+2. (Rule: Pause-downs on a temporary up-trend.) The market fell to just above the earlier low after three bars in the daily interval. This was not proof of the type III pause-down call, or confirmation of the top-off, but it was consistent with such a view. The forecast of a topping-off therefore appears to have favourable risk reward trade off. In fact, after a pausing-up of one bar, a further fall followed.

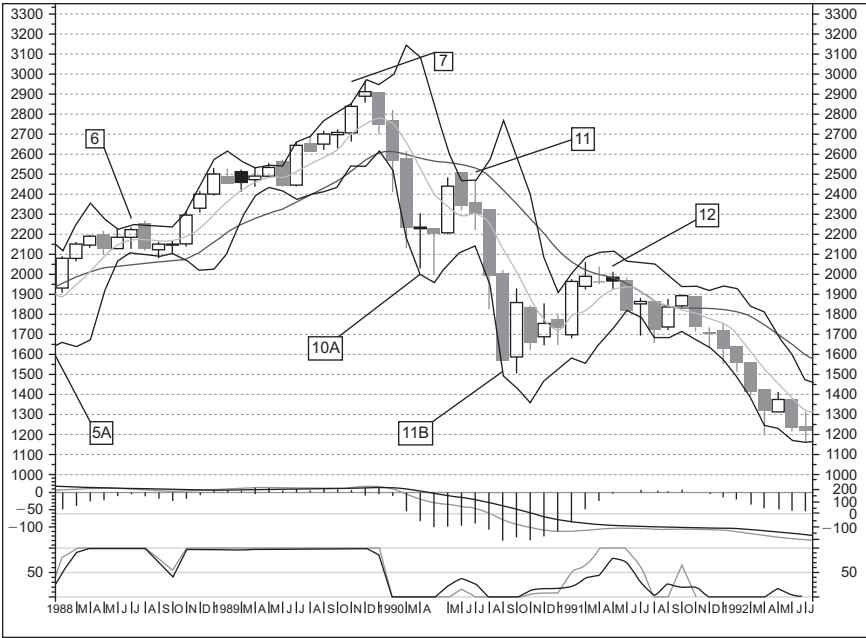
6. At point 10A, the quarterly time interval (figure 8.22) reached ghost stochastics-A; the monthly time interval (figure 8.23) fell by virtual eight bars down. Therefore, after the rebound and

- fall, the half-yearly time interval went into a bear market at point 11A. (Rule: Bear market signals.)
7. After the strong rebound at point 10A, the weekly time interval fell by four bars to point 11A for a type II pause-down. This sent a signal that the rebound was only temporary. (Rule: Temporary rebound signals.) As a result, the market fell to a new low. But, before falling to a new low, there was a type II rebound for two bars after the four-bar decline in the weekly time interval. The rebound completed a type II pause-up before topping-off; the fall came after the sixth rising bar in the two-week interval to ghost stochastics-B with the MACD histogram in the negative; the cap of the temporary pause-up was reached after rebounding from virtual eight bars down in the monthly interval. (Rule: The six-bar rule in temporary pausing-up.)



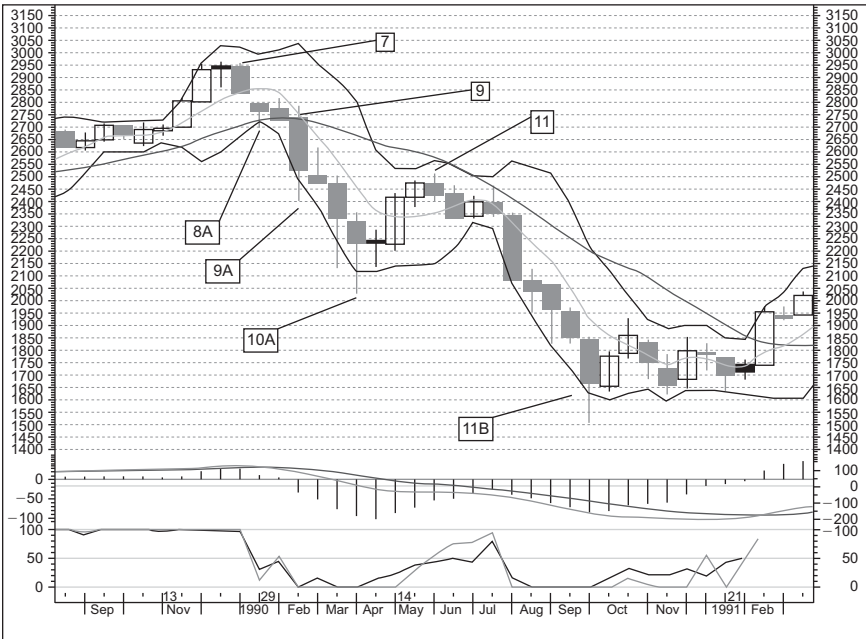
**Figure 8.22** Quarterly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



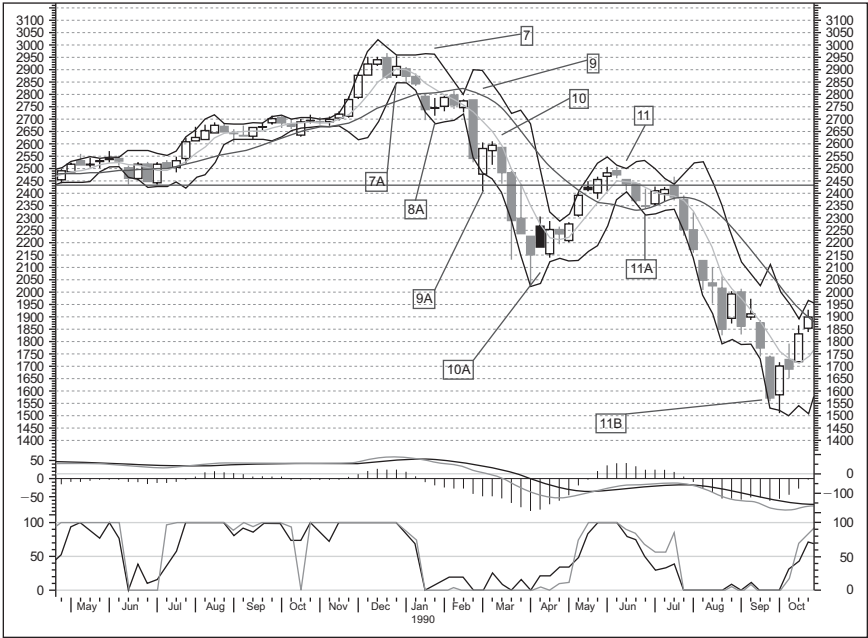
**Figure 8.23** Monthly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



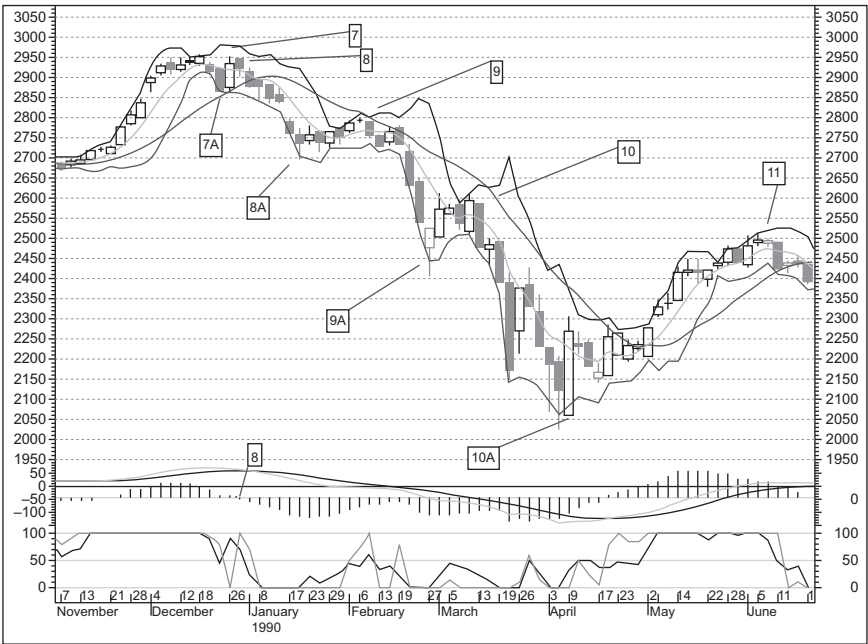
**Figure 8.24** Two-week time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



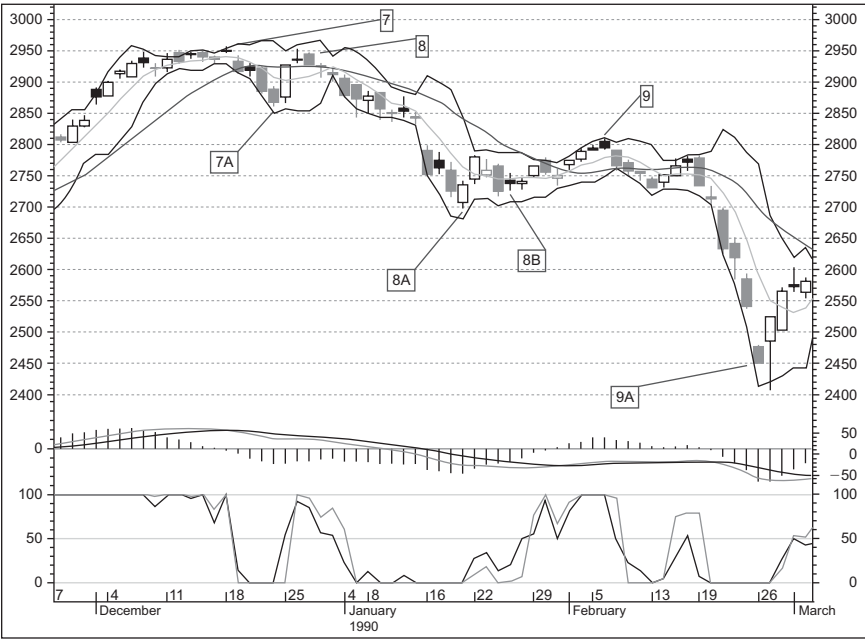
**Figure 8.25** Weekly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



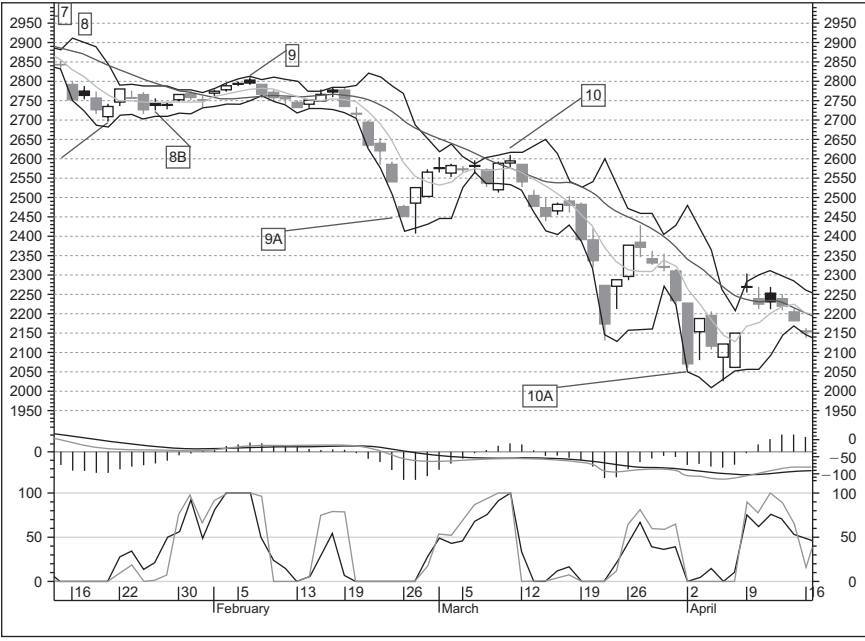
**Figure 8.26** Two-day time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.27** Daily time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.28** The second daily time interval chart

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### 8.3.3 The Bursting of the Bubble in 1990, II—Topix

The following discussion continues the examination of the decline following the bursting of the bubble in 1990. The discussion is based on figures 8.29 to 8.33. These figures show the four-year time interval chart, the two-year time interval chart, the yearly time interval chart, the half-year time interval chart, the quarterly time interval chart, and the monthly time interval chart respectively. The monthly time interval chart displayed in Figure 8.33 is not directly referred to in the discussion. It is offered here to show more detailed market dynamics at the beginning of the time segment to be discussed.

1. After falling to stochastics-B in the half yearly time interval (figure 8.31) and by virtual eight bars in the quarterly time interval (figure 8.32) at point 11B, the market rebounded for two bars in the quarterly time interval before falling to a new low. At point 12A, the yearly time interval (figure 8.30) fell into the bear market. (Rule: Bear market signals.)
2. At point B, the quarterly time interval rose by eight bars to reach stochastics-B with the MACD histogram remaining negative. The market topped off on the bearish yearly time interval. (Rule: Bear market cap.)
3. After rebounding at point 13A, the quarterly time interval rose by virtual eight bars; the half yearly time interval rose to stochastics-B with the MACD histogram remaining negative. As a result, the market topped off at point 14 due to the yearly time interval being still in the bear market. (Rule: Bear market cap.)

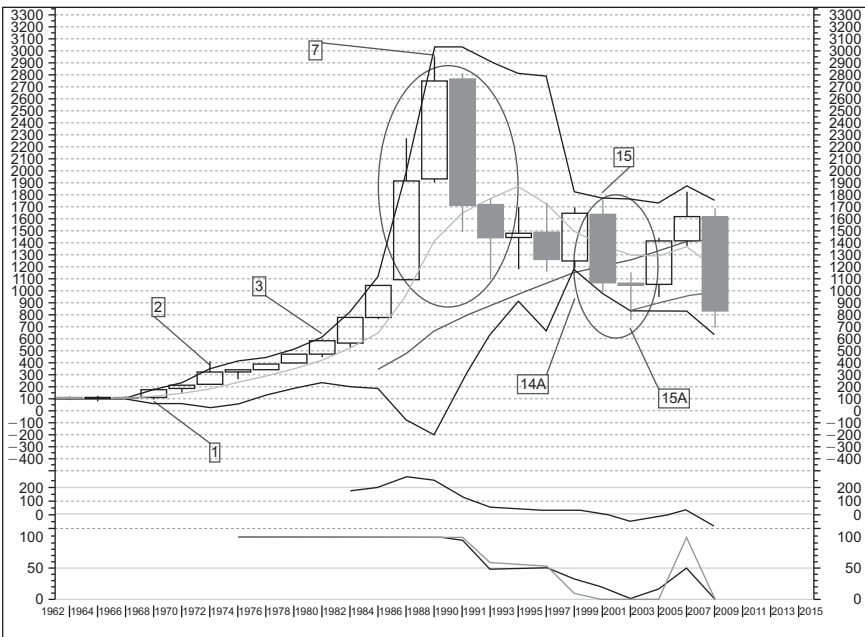
The market fell to ghost stochastics-A in the yearly time interval and virtual eight bars in the half yearly time interval at point 13A. The rebound to point 14 lasted for two bars in the half yearly time interval before the market fell to a new low. Therefore at point 14A, the two-year time interval (figure 8.29) turned into the bear market. (Rule: Bear market signals.)

4. The two-year time interval rebounded from the bear market at 14A. At point 15, the half yearly time interval reached virtual eight bars with the MACD histogram still in the

negative. The market topped off at point 15 as the two-year time interval was still in the bear market. (Rule: Bear market cap.)

At point 14A, after falling by more than eight bars in the yearly time interval, the market rebounded to virtual eight bars in the half yearly time interval (more than the required virtual eight bars in the quarterly time interval) before falling to a new low. Therefore, at point 15A, the four-year time interval (chart not displayed) turned into the bear market. (Rule: Bear market signals.)

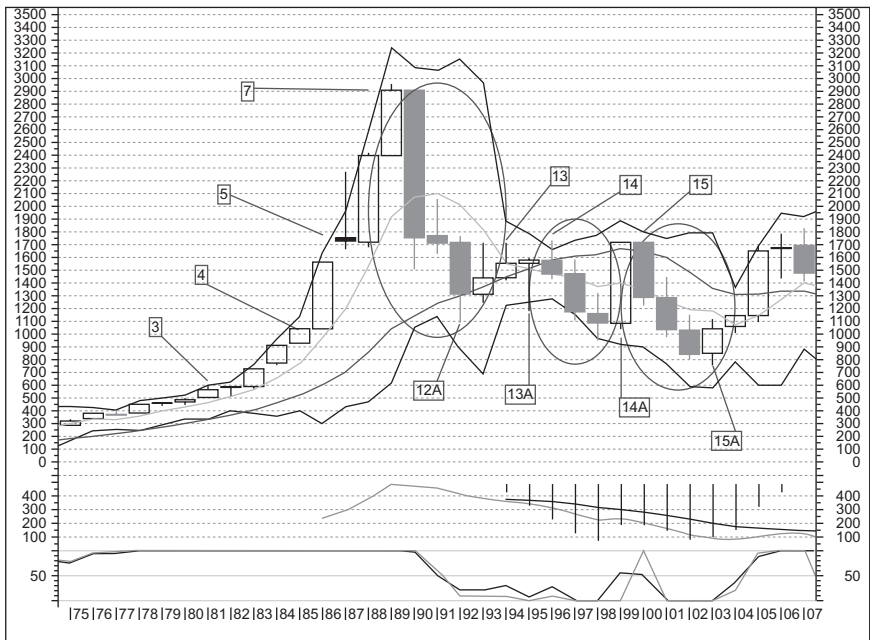
5. At point 15A, the two-year time interval fell by quasi-eight bars, completing a falling wave (irregular) before rebounding. (Rule: Pausing-up on a temporary downtrend.)



**Figure 8.29** Two-year time interval chart

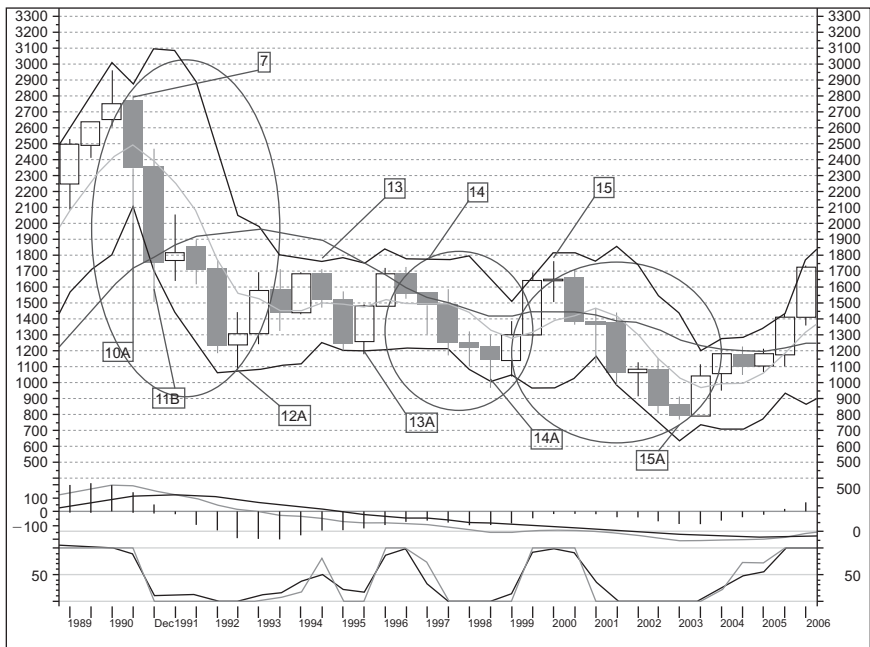
Source: Data used with permission from eSignal. Graphic used with permission from MetaStock





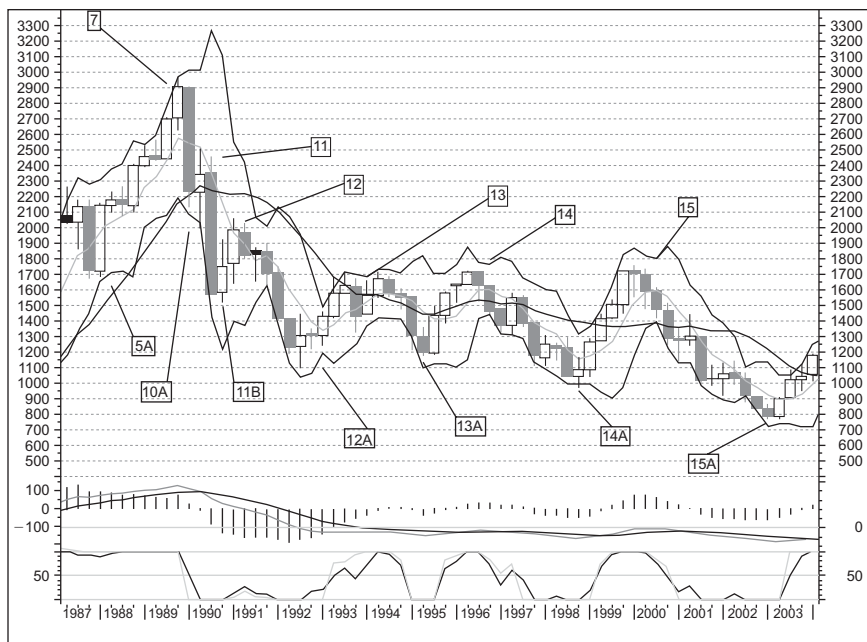
**Figure 8.30** Yearly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



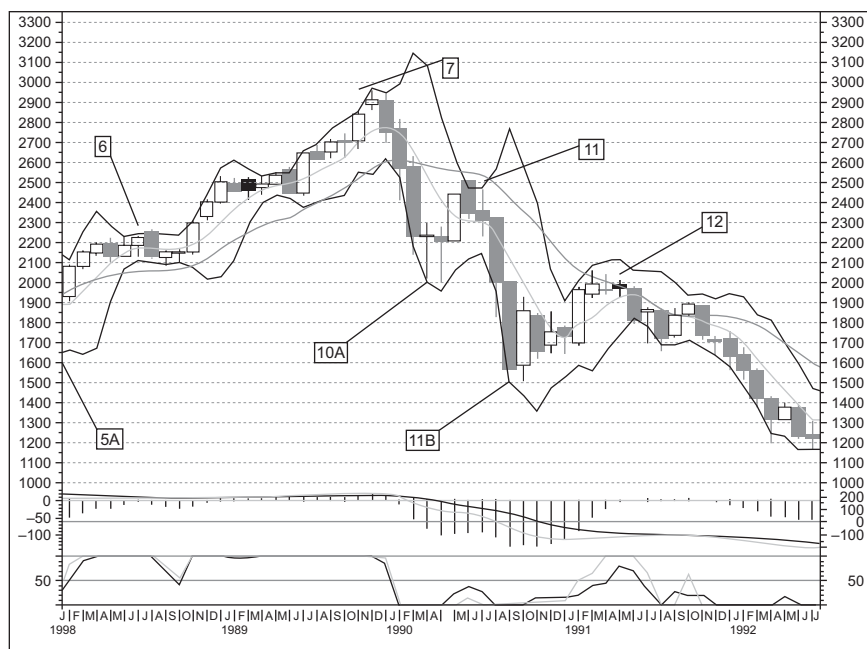
**Figure 8.31** Half-year time interval chart

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**Figure 8.32** Quarterly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.33** Monthly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

## 8.4 CASE 4: THE 2003 REBOUND AND 2007 CRASH

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### 8.4.1 The Rebound in 2003—Topix

The rebound in 2003 is analyzed using figures 8.34 to 8.39 for the charts of four-year intervals, two-year intervals, one-year interval, half-year interval, quarterly interval, and monthly interval.

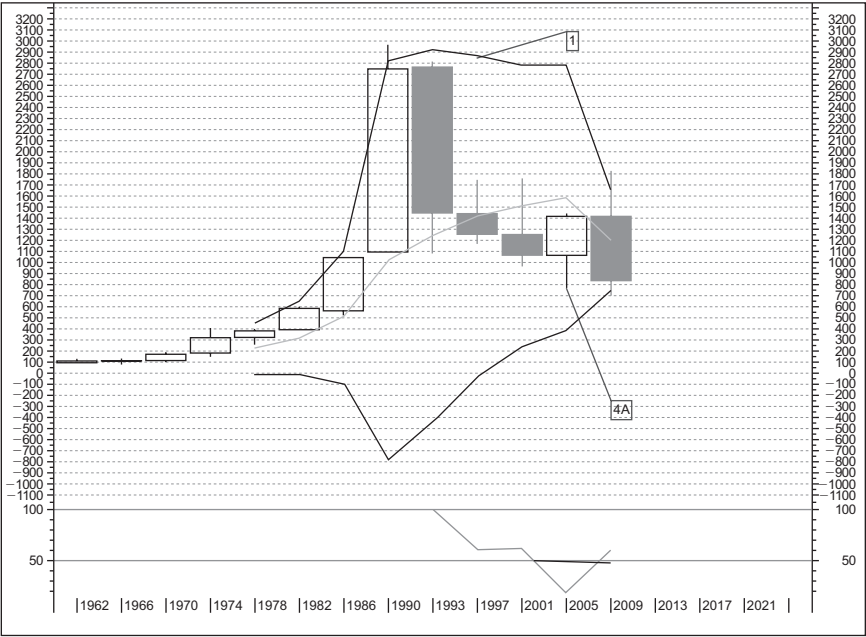
1. In the half-year time interval (figure 8.37) after falling by five bars, the market rebounded at point 1A to point 2 for at least a rise of two bars and a type II pause-up. Because the rise did not reach a new high at the fourth bar, no assertion can be made for a four-bar rise into the bull market in the half-year time interval. (Rule: Bottoming-out on a pause-down.)
2. The yearly time interval (figure 8.36) fell by nine bars at point 3A, then rose to virtual eight bars in the half yearly time interval for a type II pause-up, before topping-off. (Rule: Bear market cap.)
3. At point 4A, the market fell from point 1 for three downward waves in the yearly time interval and for quasi-eight bars in the two-year interval (figure 8.35). A type I pause-up for two bars in the two yearly time intervals was expected. (Rule: Pausing-downs from historical high rule applied to pausing-up in a down-trend.) Without the Bollinger lower band+2 being reached, a type II pause-up was still possible, but not very likely.
4. After rebounding at point 4A, the monthly time interval (figure 8.39) fell at point 5 for six bars to point 5B, the quarterly time interval (figure 8.38) fell for hidden two bars. But the market did not reach a new low at point 5B as compared with point 5A. Therefore it was not exactly a type II pause-down in the quarterly time interval if the falling bars were counted. But it could at least be viewed as a weak type II pause-down and used as the base to forecast at least a type IIc pause-down at the next pausing point. (Rule: Implication of category IIc pauses.)

Additionally, the market fell to ghost stochastics-B in the monthly time interval, or virtual eight bars down in the two-week time interval. This was consistent with a two-bar decline in the quarterly time interval for a type II pause-down, further affirming the expected pause-down at the next pausing point for at least a type IIc fall. (Rule: Implication of a type II pause.)

5. At point 5B, the two-week time interval fell by virtual eight bars, and the MACD histogram in the monthly time interval was still positive. The market rebounded as the quarterly time interval had turned into the bull market. A pause-up of at least two bars was expected but not yet completed; the market rebounded to reach a new high. (Rule: Bull market floor.)
6. The expected two-bar pause-up in the two-year time interval was still incomplete at point 6. Neither did the rise reach virtual two bars in the two-year time interval. Therefore, after the half yearly time interval fell by one or two bars for a type I or type II pause-down, further rises were expected. (Rule: Bull market floor.) In fact, after a four-month decline, the market rose again. But the fall was completed at point 6A after a decline of eight months, as displayed in the monthly interval chart. It was a combo bottom-up rebound.
7. The monthly time interval bottomed up at point 6A to reach a new high and a resistance level at point 7 after rising for quasi-eight bars. As the MACD histogram in the monthly time interval remained negative, at least a pause-down of two bars was expected. (Rule: Turning after rising for eight+ points.)
8. At the same time, the two-year time interval reached ghost stochastics-B at point 7; the yearly time interval reached virtual eight bars with the MACD histogram staying negative. Therefore, at least a two-bar pause-down in the yearly time interval was expected for a two-year decline. (Rule: Turning after rising for eight+ points.)
9. The pause-down on the way up from point 4A was slightly weaker than a clear-cut type II pause-down. But it was a firm type IIc and consistent with a type II pause-down interpretation. Therefore, the rebound from point 4A is highly likely to be just a temporary rebound.

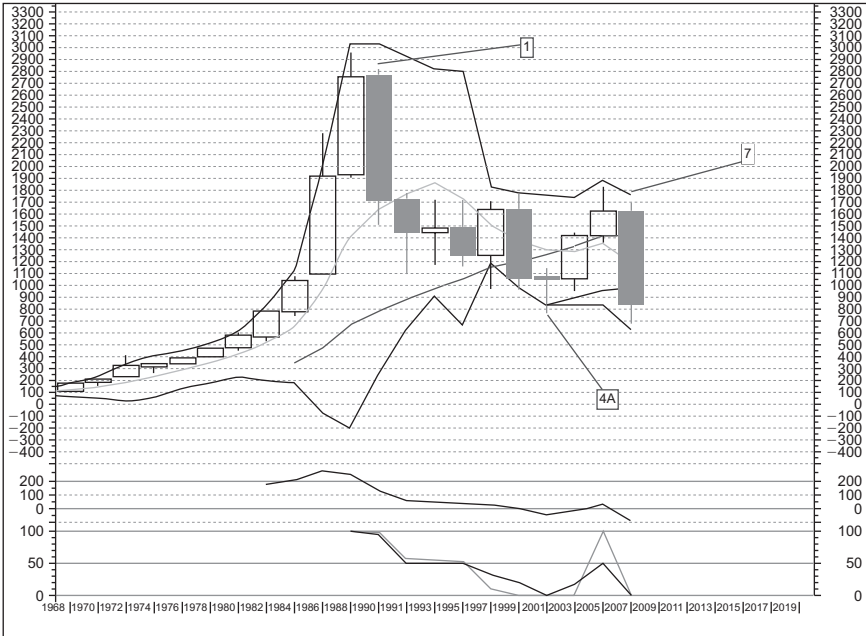
As pointed out in section 8.1, the US market signaled a clear expectation for an imminent fall at this point. If the linkage among the global financial markets was considered, the temporary nature of the rebound can be further affirmed.

As mentioned in case 3, the four-year time interval (figure 8.34) entered into the bear market at point 4A (point 15A in case 3 charts). If the rebound was only temporary, after the two-year time interval rose to ghost stochastics-B and the yearly time interval rose to virtual eight bars at point 7, the market was expected to top off and only type I pause-ups were expected on the way down. (Rule: Bear market cap.)



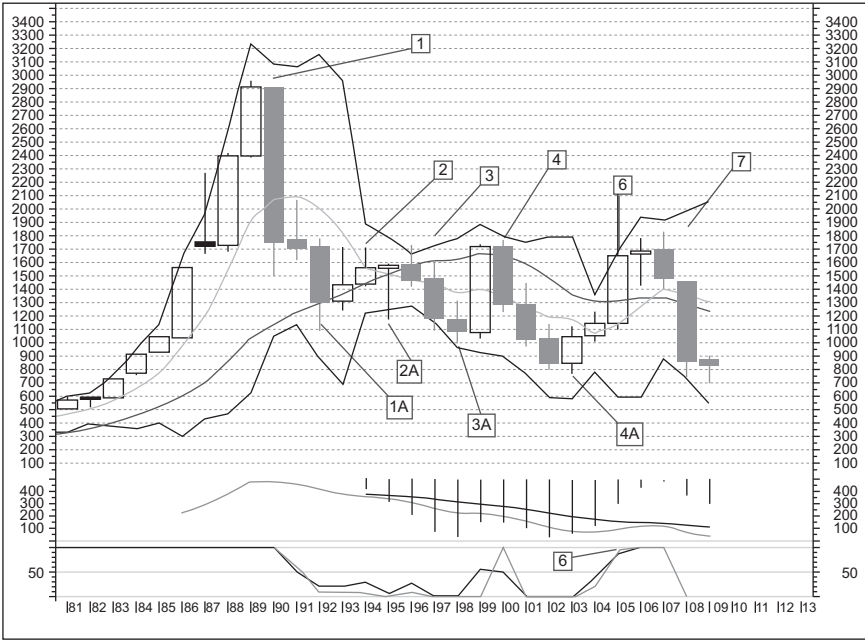
**Figure 8.34** Four-year time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



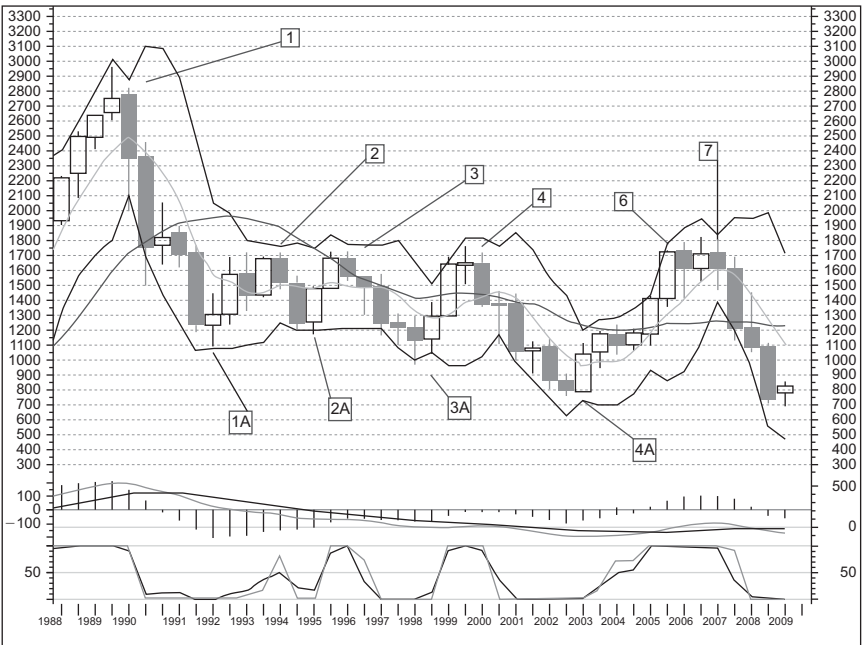
**Figure 8.35** Two-year time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



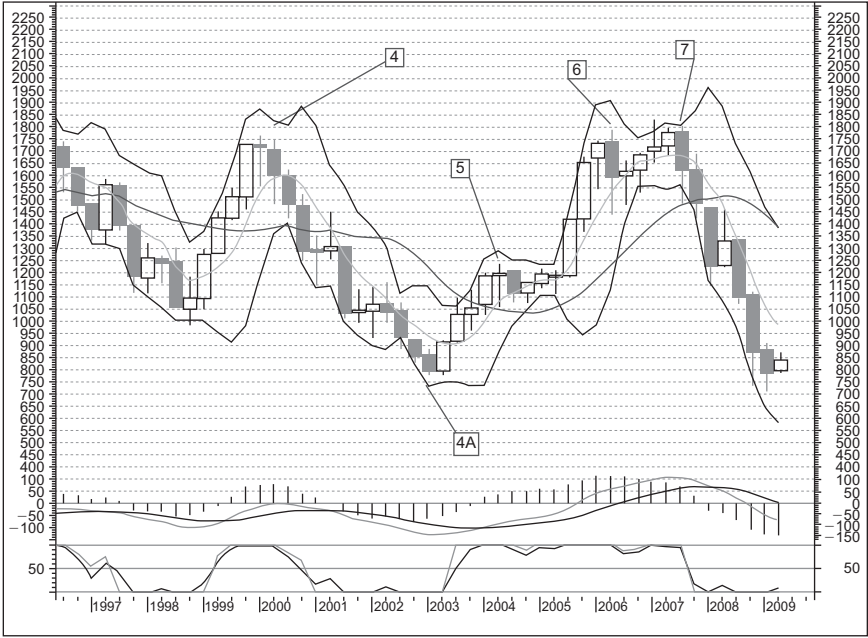
**Figure 8.36** Yearly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



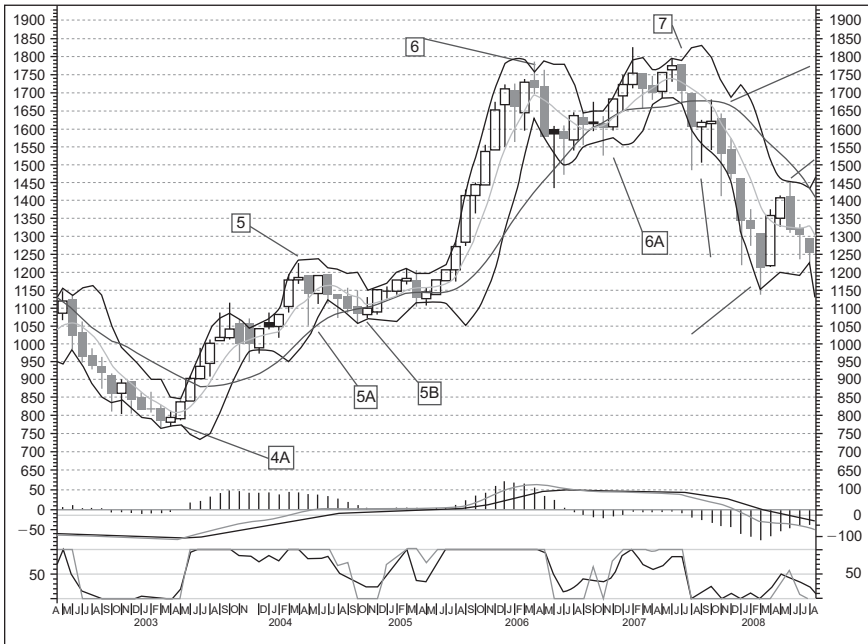
**Figure 8.37** Half-year time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.38** Quarterly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.39** Monthly time interval chart

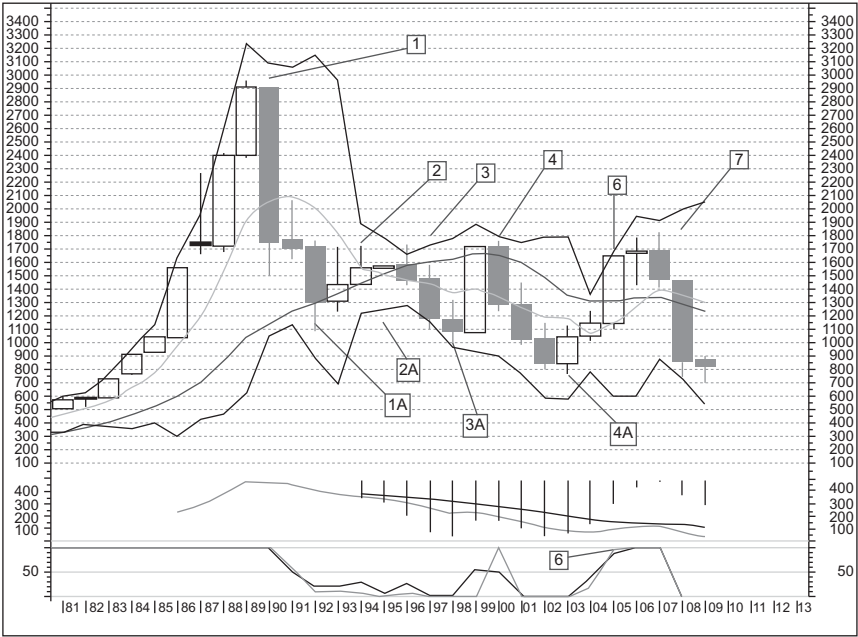
Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

### 8.4.2 The Fall After the Crash in 2007—Topix

The fall of Topix after the crash in 2007 is analyzed using figures 8.40 to 8.43, showing the charts of the yearly interval, half-year interval, quarterly interval and monthly interval. Figures 8.35 and 8.36 for the four-year interval chart and the two-year interval chart displayed in the previous pages will also be used.

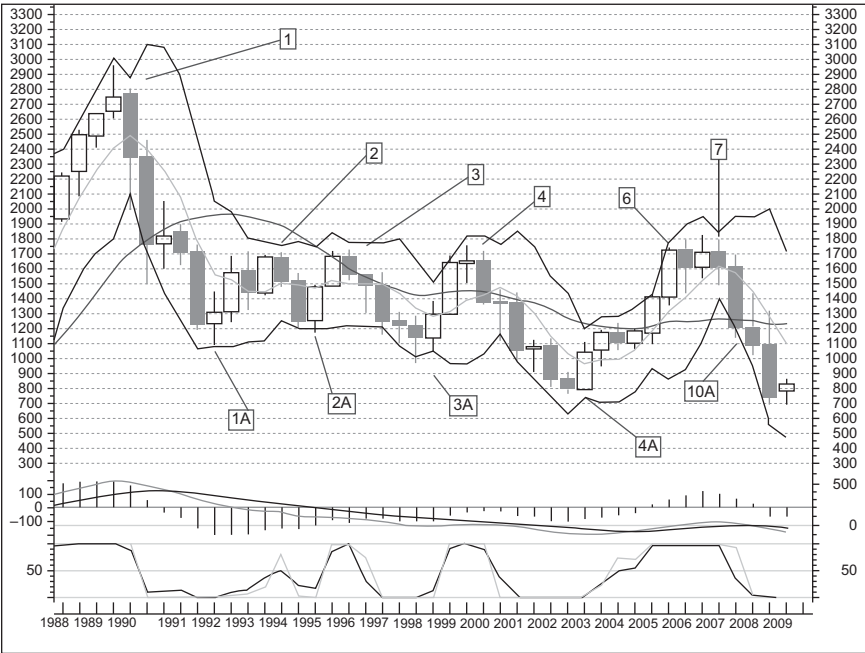
1. As pointed out in the previous analysis about the rebound that started from 2003, there were weak type IIc pause-downs on the way up from point 4A. There were also signals from the international market for an imminent large downward adjustment, as can be seen from the analysis of the US market preceding the 2007 crash. Therefore, the rebound from point 4A was not a final bottom-up rebound. As mentioned in case 3, the four-year time interval (figure 8.34) entered into the bear market at point 4A (point 15A in case 3 charts). At point 7, after the two-year time interval (figure 8.35) rose to ghost stochastics-B and the yearly time interval (figure 8.40) rose to virtual eight bars, the market was set to top off and to fall to the next market up turning point. (Rule: Bear market cap.)
2. At point 8A, the monthly time interval fell to stochastics-A with the MACD histogram turning negative. The two-week time interval fell by virtual eight bars. Although the quarterly time interval reached the Bollinger lower band +2, the rebound was expected to be a type I pause-up for one month or four weeks if the fall was a result of a topping-off decline. (Rule: Type I cap and floor after market reversal.) In fact, the market fell to a new low after rising for four weeks to point 10 for a type I pause-up. While the rebound from the lowest point, reached before point 8A, to point 10 in the monthly interval chart looked like a type II rebound, it masked the fact that the final rebound did not start from the lowest point.
3. At point 10A, the quarterly time interval fell to stochastics-A with the expected at least two-year decline still incomplete; the quarterly time interval rose for a type I pause-up before falling at point 11 to a new low. (Rule: Pause-up on a temporary fall.)





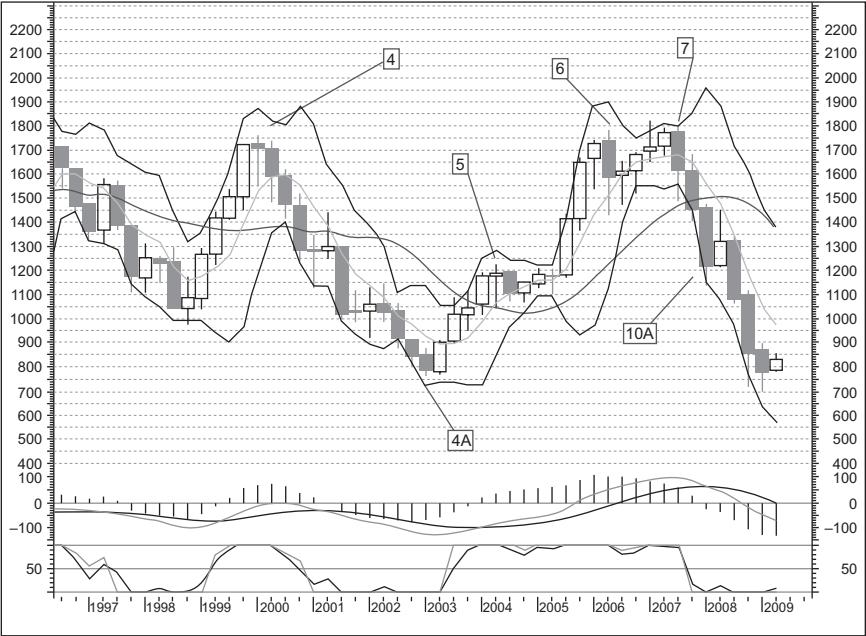
**Figure 8.40** Yearly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



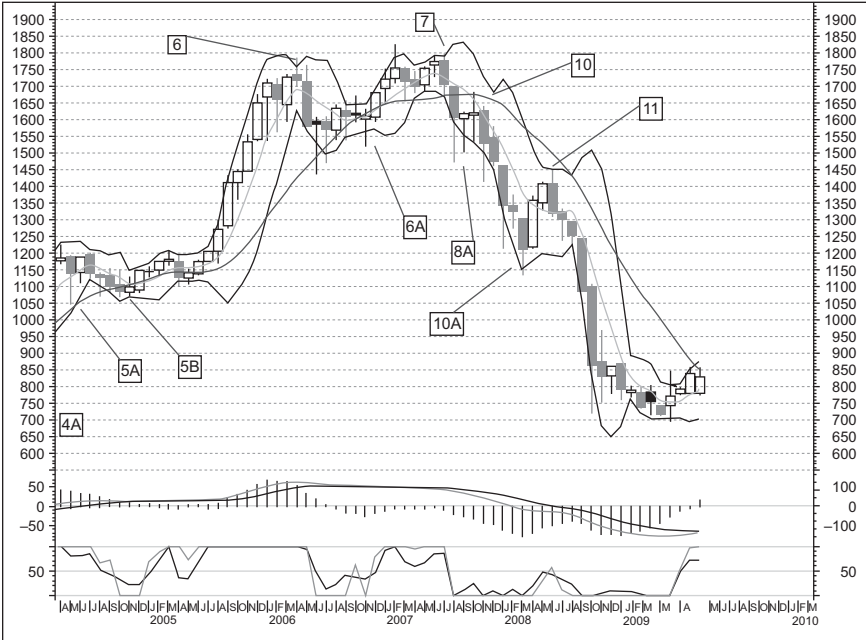
**Figure 8.41** Half-year time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.42** Quarterly time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.43** Monthly interval chart

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## **8.5 CASE 5: THE 2007 CRASH—SHANGHAI COMPOSITE INDEX**

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### **8.5.1 Market at the Turning Point—Shanghai Composite Index 2007**

The following discussion first examines the market dynamics leading to the decline of the Shanghai Composite Index in 2007. The analysis is based on figures 8.44 to 8.50 for the charts of a quarterly interval, monthly interval, two-week interval, weekly interval, two-day interval, daily interval, and second daily interval.

1. When the market rises to a historical new high with strong momentum, if without signals such as the MACD histogram being negative or MACD divergence, it is difficult to determine the exact timing of pause-downs. In fact, it is not certain whether there will be a pause-down or how long the pause-down will last. In this situation, the best strategy is to take a cautious approach, getting out of long positions towards the completion of conditions required by the 2-of-3 rule, and waiting for the expected pause-down to complete before taking a long position again. (Rule: 2-of-3 rule.) Alternatively, one can wait for a display of incomplete rising waves in low-order intervals to help determine the start of a high-order interval pausing-down before taking short positions. (Rule: Aborted waves.) Obviously, it would be highly helpful if pause-downs can be ascertained by referring to the conditions specified in the pausing-down rules (Rule: Pausing-downs from historical high.)
2. After strong rises, the index paused down for three bars each at point A and point B in the two-week time interval (figure 8.46), completing four rising waves in the time interval (as indicated in the monthly time interval, figure 8.45) before falling back at point 1. At least the same three-bar decline in the two-week time interval can be expected. But a two-bar decline in the monthly time interval is a highly likely outcome after rising for 8+ bars and completing four waves in the two-week interval. (Rule: Pausing-downs from historical high.)

Additionally, because the quarterly time interval (figure 8.44) rose for more than eight bars, a one- or two-bar pause-down in the quarterly time interval was also possible.

The risk was high for a large and enduring decline when the macroeconomic condition was taken into consideration. As inflation was getting out of control, forceful and sustained monetary tightening was underway. Given the clearly displayed expectation for inflation, a soft landing was unlikely. A sharp deceleration of growth was in the making; the stock market could be expected to suffer a recession-type decline with a high degree of confidence.

3. After the market fell from point 1 to point 1A, the MACD histogram in the daily time interval (figure 8.49) turned negative, sending the interval into the bear market. A two-bar pause-up followed in the daily time interval for an eight-bar rise in the daily -2 time interval (or 60-minute time interval, not displayed) before the market topped off as a result of the daily time interval being in the bear market. The fall reached a new low. (Rule: Bear market cap.)
4. At point 1A, the daily time interval fell to stochastics-A, or for virtual eight bars (not displayed) in the two-day -2 time interval (2h time interval), followed with a two-bar pause-up in the daily time interval before falling to a new low. A two-bar pause-up in the 2h time interval was required for the ensuing fall to turn the two-day interval (figure 8.48) into the bear market. Therefore, after falling to a new low at point 2A, the two-week time interval entered into the bear market. (Rule: Bear market signals.) Additionally at point 2A, the two-week time interval was signaled to have turned bearish as a result of the MACD histogram falling to the negative. (Rule: Bear market signals.)
5. After rebounding at point 2A, the market rose for four bars and stochastics-B in the daily time interval at point 3 (figure 8.50), with the MACD histogram in the interval remaining negative. The market topped off at point 3 as a result of the two-day time interval being in the bear market. (Rule: Bear market cap.)
6. The market rebounded at point 3A for one bar in the daily time interval (call it time interval t for easy reference in the

following discussion), turning time interval t-3 into the bull market. A fall of four bars in the daily t time interval followed, turning time interval t-3 from the bull market into the bear market, then balanced market at point 3B. Therefore, the rebound at point 3B should be regarded as the start of another rebound, rather than as the continuation of the earlier rebound in the analysis of the rebounding path.

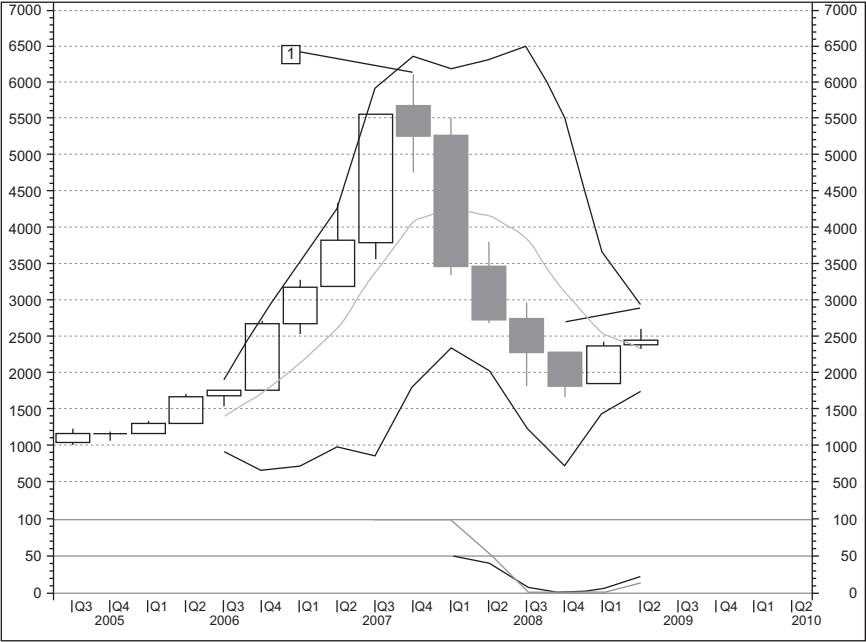
7. Rebounding from point 3B to point 4, the daily time interval rose by six bars to enter the bull market with the MACD histogram also turning positive. Therefore, after the market fell back to the daily interval bear market, the last rebound was signaled to have failed and the rebound at point 4A should be regarded as the start of another rebound. (Rule: Topping-off on a pause-up.)

The market fell at point 4 because the rebound at point 3B started before reaching the pause-up point. At point 3B, the market fell by seven bars in the weekly time interval (figure 8.47) and broke the Bollinger lower band+2 without reaching another supporting point. Therefore, the fall at point 4 is required for the completion of eight falling bars (or more) in the weekly time interval at point 4A before rebound.

8. At point 5, the two-week time interval entered into the bear market with the MACD histogram turning negative. The weekly time interval rose by four bars to reach stochastics-B with the MACD histogram still in the negative. Therefore, in case the overall fall was incomplete, the market was expected to top off at point 5. (Rule: Bear market cap.)

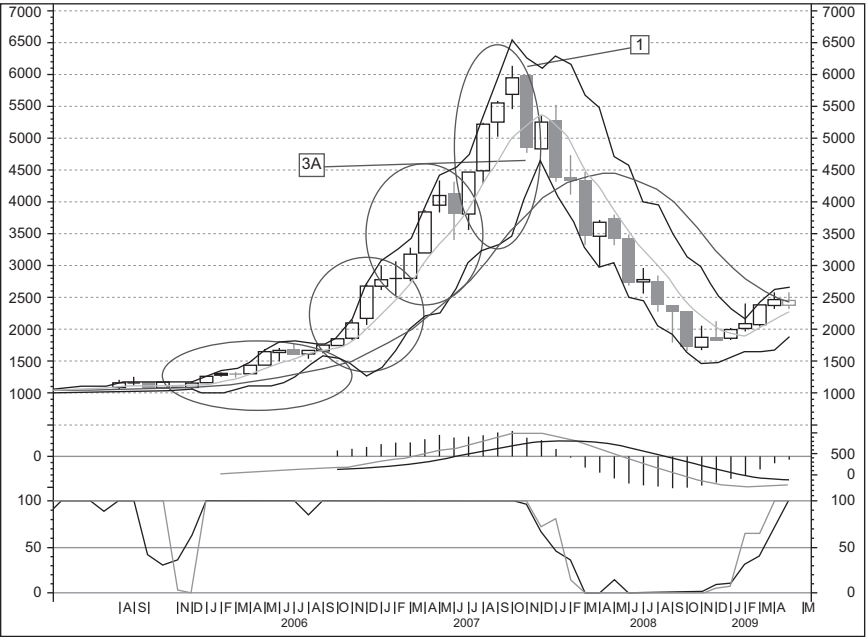
Additionally, after completing daily-1 time interval (2h time interval, not displayed) upwaves to rise nine bars in the two-day time interval, the market rose to stochastics-B in the weekly time interval with the MACD histogram still being negative. Therefore, there should be at least a type I pause-down of two-bars in the two-day time interval. In reality, the market topped off at point 5 to fall to a new low. (Rule: Bear market cap.)

9. On the way up to point 5, there were no type II or type III pause-downs, despite the fact that the rebound from point 4A to point 5 was not the bottom-up rebound. It is an example that a rebound with at most a type I pause-down on the way up is not necessarily the bottom-up rebound.



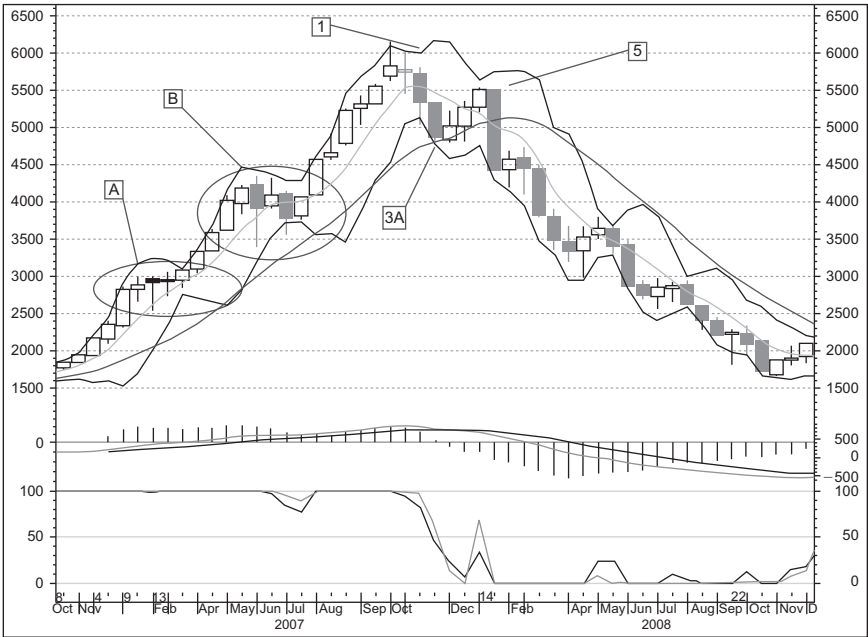
**Figure 8.44** Quarterly interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



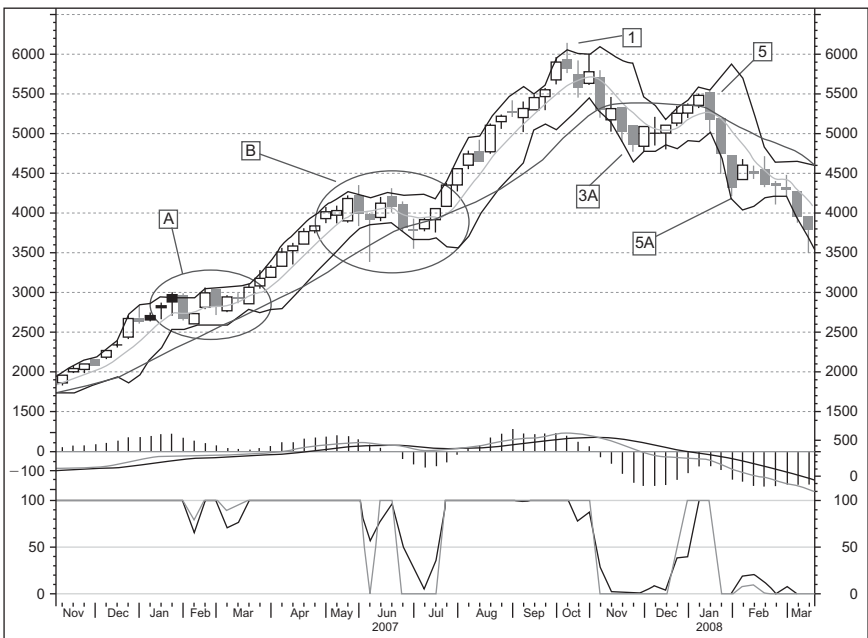
**Figure 8.45** Monthly interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



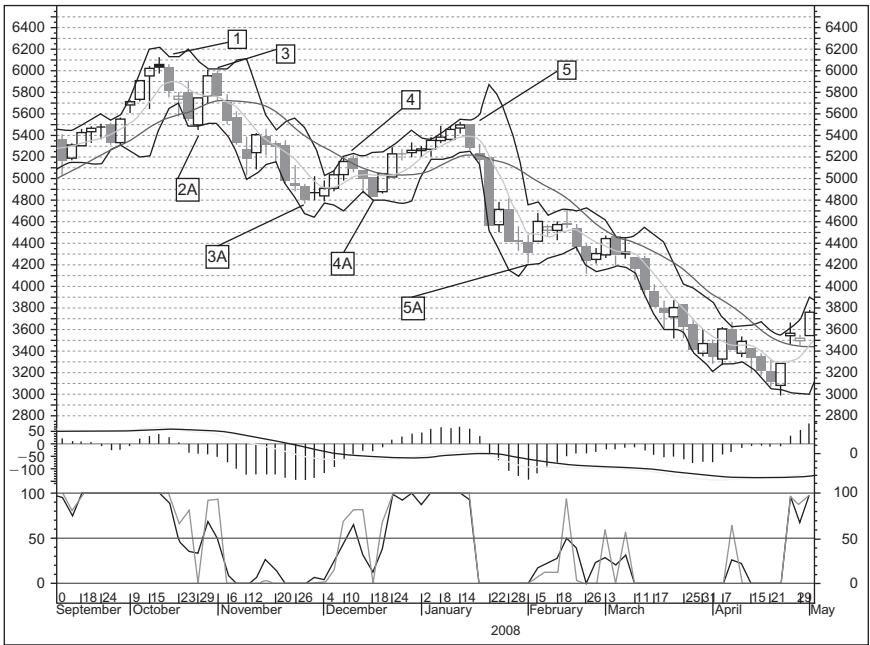
**Figure 8.46** Two-week interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



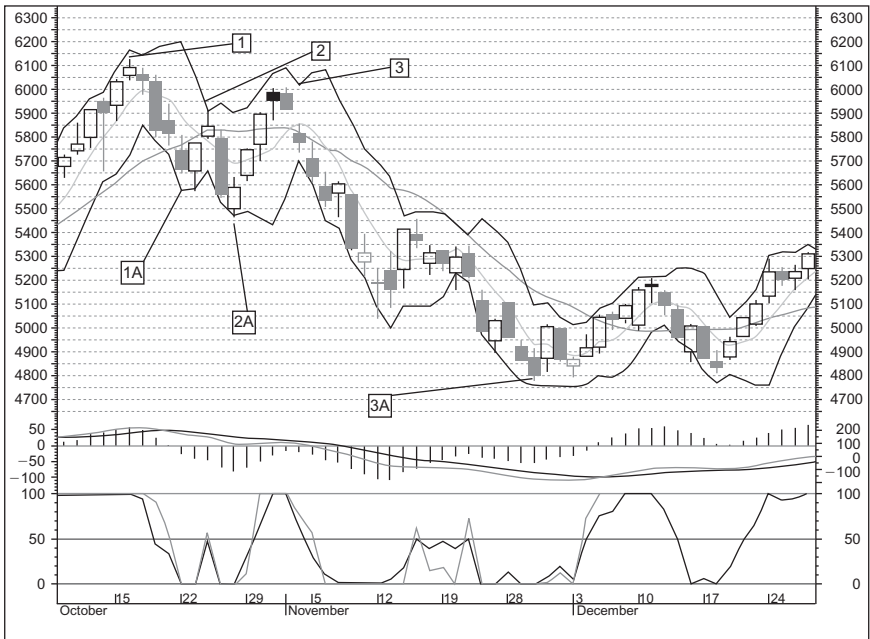
**Figure 8.47** Weekly interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.48** Two-day interval chart

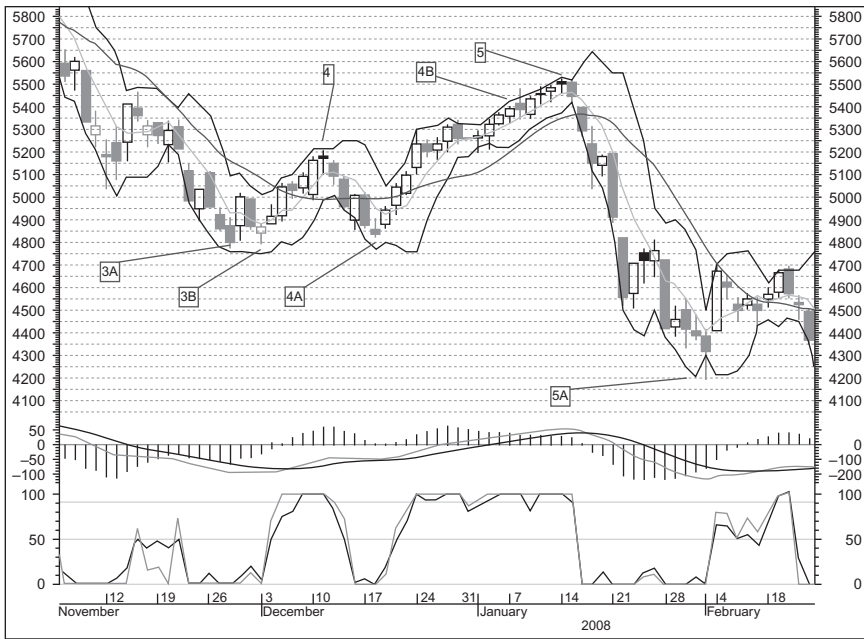
Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.49** Daily interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock





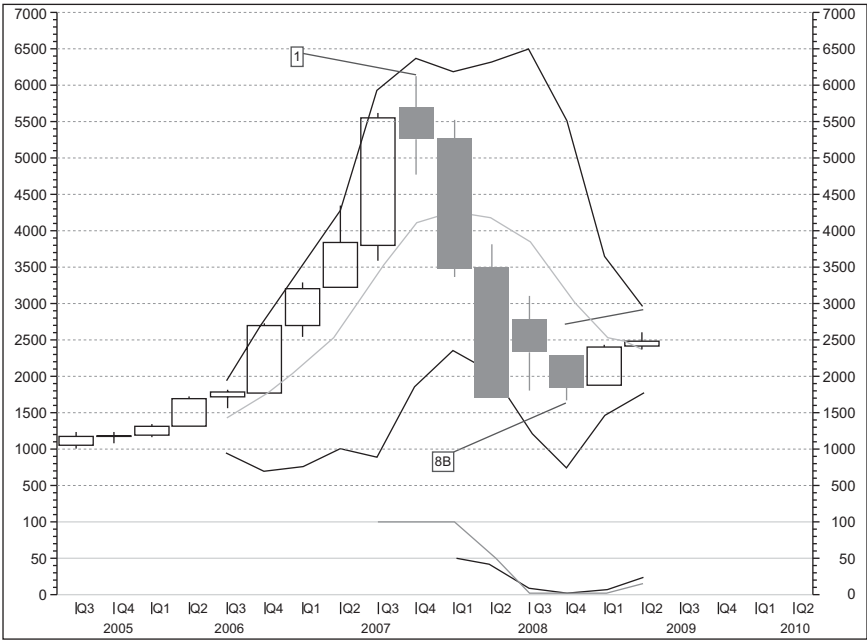
**Figure 8.50** The second daily interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

## 8.5.2 The Crash of 2007—Shanghai Composite Index

The continued fall of 2007 after the turn of the market is analyzed using figures 8.51 to 8.56. The figures cover charts of the quarterly interval, monthly interval, two-week interval, weekly interval, two-day interval, and the daily interval.

1. After falling from point 5 to quasi-eight bars down in the two-week time interval (figure 8.53), the market rose at point 5A and point 5B for 4+4 bars in the two-day time interval (figure 8.55), in place for a two-bar pause-up in the two-week time interval. This was a type Ic pause-up. It is often difficult to anticipate what form a two-bar pausing-up is going to take, straight two rising bars or a 1+1 combo pausing-up. This is especially true when the pausing-up is expected to be of type I.

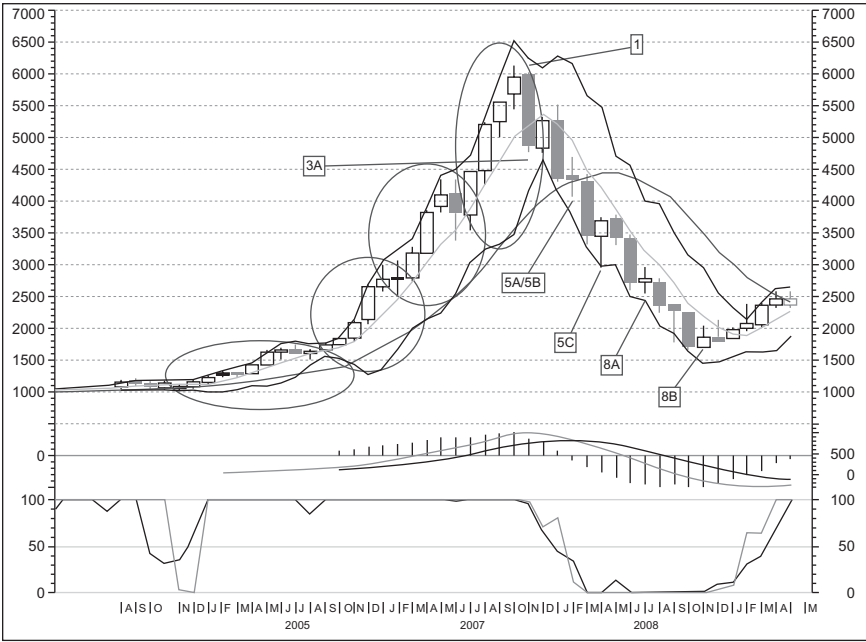


**Figure 8.51** Quarterly interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

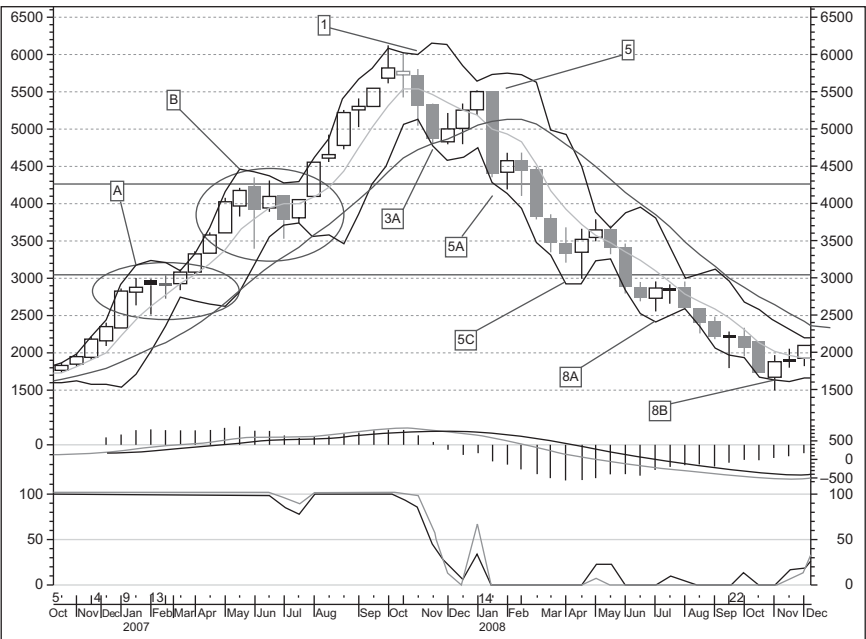
What can be anticipated with a strong degree of regularity is the duration of the pause-up after falling for eight bars or quasi-eight bars to a support level when there have been type II pauses on the way down. In this case, if the Bollinger lower band+2 in time interval  $t+1$  has been reached, a type II pause-up is expected. Otherwise, if other forms of a supporting point have been reached, a type I pause-up is possible. Furthermore, even in this case, whether the pause-up will take the form of straight rises or a combo-pause-up is also difficult to anticipate with high degree of certainty. Therefore, a conservative strategy would be to maintain no position against the original trend after the temporary pause has completed half of its anticipated course. (Rule: The halfway rule.)

2. At point 6, the pause-down after reaching stochastics-B in the two-day time interval was of type I, which can be confirmed by the more detailed view provided by the daily time interval chart (figure 8.56). However, the fall of three bars at point 7 in



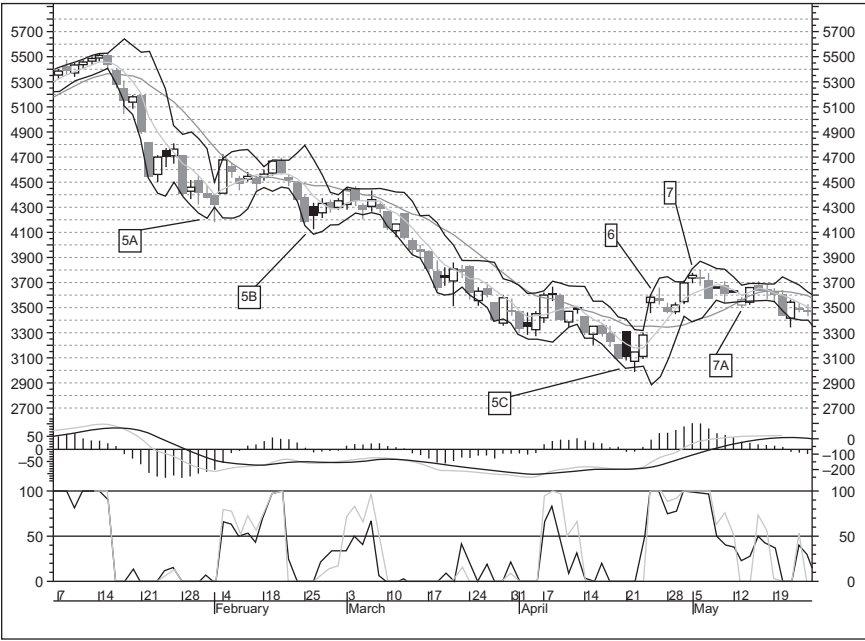
**Figure 8.52** Monthly interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



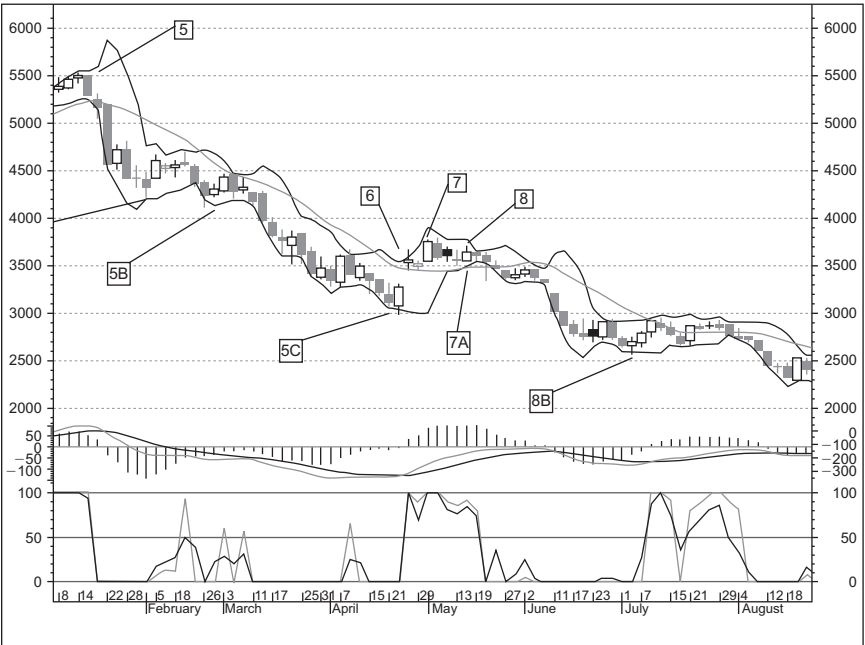
**Figure 8.53** Two-week interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



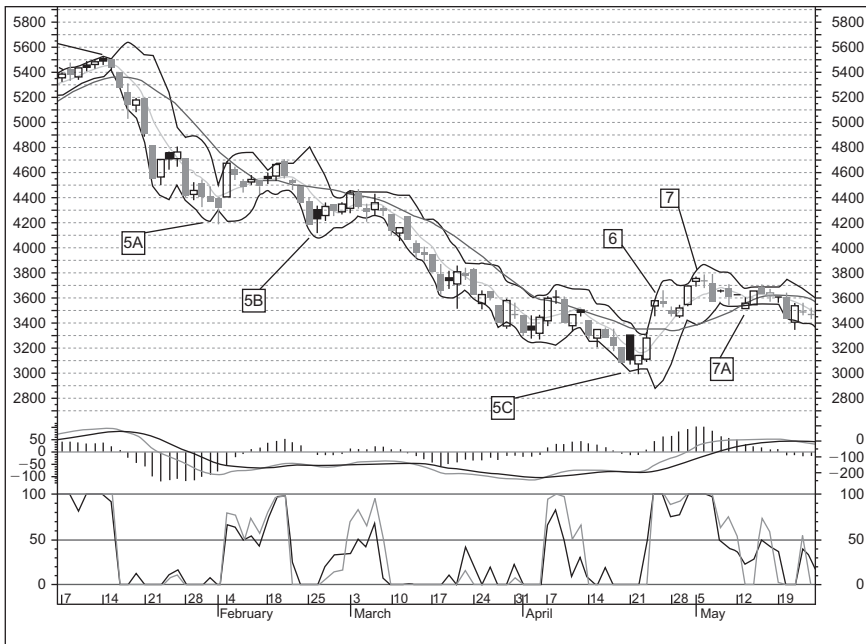
**Figure 8.54** Weekly interval chart

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**Figure 8.55** Two-day interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock



**Figure 8.56** Daily interval chart

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the two-day time interval after rising for four bars was a type III pause-down. Therefore, the market topped off at the next pausing point after rising for eight bars in the two-day time interval. (Rule: Cap after type III pause-down.)

Viewed from the perspective of the two-week time interval and the monthly time interval, at point 5c, the market fell by three downwaves in the two-week time interval, but it fell by only six bars in the monthly time interval (figure 8.52) and did not reach a support level for the interval. Therefore, the pause-up was expected to be of type I for one bar in the monthly interval, or two bars in the two-week time interval, or eight bars in the two-day time interval. (Rule: Pause-ups on a temporary downtrend.)

3. At point 8A, the monthly time interval fell by eight bars. The stock market fell to below the MA-14 line in the quarterly time interval (figure 8.51) without reaching any support

level. Therefore, there was only a weak one-bar pause-up in the monthly time interval. (Rule: Pause-ups on a temporary downtrend.)

At point 5C, the market fell by more than eight bars in the two-week time interval; it then rebounded for two bars before falling to a new low. Therefore, the quarterly time interval fell into the bear market at point 8A, and remained in the bear market at point 8B. (Rule: Bear market signals.)

## Random Walk, Efficient Market vs. Market Activism

The first eight chapters have focused on presenting the structure and analytics of the FVITA system. The next three chapters extend the scope of the discussion. Chapter 9 discusses the validity of market activist approaches in general and offers a theoretical argument for technical analysis in particular. The chapter addresses the main issues surrounding the efficient market hypothesis (EMH), but does not intend to provide a full review of the voluminous academic literature. The aim is to offer a brief road map of the fundamental issues the author struggled through in the journey from a skeptical macro fundamental analyst to a believer of technical analyses. Chapter 10 discusses the broad direction for integrating technical analyses with macro and firm fundamental analyses. Chapter 11 addresses two other issues related to technical analyses: whether becoming public knowledge diminishes the effectiveness of technical analysis and how statistical analysis should be evaluated in light of the FVITA framework introduced here.

These last three chapters are mainly intended to help those with a background in fundamental analysis who are not yet convinced of the information content of technical analysis. Hopefully, the discussion will help more people to see the value of technical analysis and the added value of integrating fundamental analysis with technical analysis. By offering a summary and critical evaluation of the main issues surrounding the theoretical arguments against technical analysis, the last three chapters may also help prepare technical analysts for a more interesting and fruitful dinner party discussion with a non-believer. People with a background in technical analysis who are

primarily interested in short-term trading and not bothered by fundamental issues raised against technical analysis may wish to skip the three chapters and go to the conclusion directly.

## **9.1 EFFICIENT MARKET HYPOTHESIS— THE ROOTS**

In the stock market, technical analysis is carried out by almost all major brokerages. In the foreign exchange market, technical analysis is employed by more than 90 percent of currency traders in formulating their trading strategies.<sup>1</sup> However, in much of the academic circles, it is regarded as being not much different from astrology. Underlying this stubborn rejection of technical analysis and all form of active investment management tools is the efficient market hypothesis (EMH) and its simplified and better-known expression, the random walk theory.

The original efficient market theory as developed by Eugene Fama in the 1960s is expressed in three different forms: the weak form, the semi-strong form and the strong form. In the weak form, it says that past stock market prices cannot be used profitably to forecast future prices. This is a clear rejection of technical analyses, which rely on historical patterns to predict future market movements. In the semi-strong form, the efficient market theory says that no publicly available information can be profitably exploited for profit. According to this form of the EMH, fundamental firm analysis or macroeconomic analysis cannot be used profitably for active investment management. In the strong form, the efficient market theory says that not even private information can be used to forecast future market returns. If true, this would have made the rules against insider trading unnecessary.

The strong form of the EMH is not generally accepted as a valid description of the financial market, but the semi-strong and the weak form of the hypothesis have many fans and enjoy strong support, especially among academic circles. In the early years, the testing of the hypothesis focused mainly on the semi-strong form hypothesis; whether firm fundamental data can be used to forecast stock market prices. In recent years, however, more attention has been paid to study the relationship between historical prices and current market movements. Both approaches have been able to produce evidence against the EMH by rejecting the random walk theory.

While the associated random walk hypothesis has been called into question by an increasing number of statistical studies, the supporting base for the EMH has not shifted. The failure of the random walk



theory is defended on the ground that the rejection of the hypothesis in those studies is either due to bad models used or chance events.

The stock market follows a random walk if its price movement from point  $t$ , in probabilistic terms, is independent of its path before time  $t$ ; or alternatively put, the distribution of its price movement from point  $t$  is independent of its path before time  $t$ . While the EMH has been treated most times as the same as the random walk theory, strictly speaking they are different. Efficient market is neither necessary nor sufficient for the market to follow a random walk. As Leroy (1973) and Lucas (1978) show, a non-random walk can exist in an efficient market, defined as a market with no rational incentive for deviation from the equilibrium. This is either due to risk aversion or change in an expected shift in asset value outside of the market portfolio. The key difference between the random walk theory and the EMH is that the dependence or correlation between future price movements and the past price history may not be profitably exploited.

However, given the already challenging task of rejecting the random walk hypothesis convincingly, and the messy issue of deciding whether the exploitation of forecastable prices is profitable, testing of the random walk hypothesis has been the focus of the statistical studies. Therefore, the relevance of results from these studies to the EMH is left as very much a matter of personal beliefs; and people on both sides of the issue hold their beliefs firmly.

EMH has its deep roots in economics and mirrors closely the invisible hand theory of Adam Smith and the zero profit condition for firms in competitive industries postulated in neoclassical economic theory. According to the invisible hand theory, the market price (in the goods market) is the invisible hand that guides the activities of the producers when they seek to maximize their profitability so that consumption demand is met. Without the need for the visible hands of social planners, the producers, for the sake of their own interest, will supply every unsatisfied consumption need whenever it is profitable to do so, resulting in efficient resource allocation in the economy. Efficiency here means that economic activities cannot be rearranged to make some people better off without hurting other people. The efficiency concept used in the EMH is different from that employed in the invisible hand theory. The former does not necessarily mean efficient resources allocation. However, central to both theories, no profitable opportunities are left unexploited; market prices work as a guide for profit maximizing market participants to exhaust all possibilities for profit at equilibrium.

The invisible hand theory is extended in modern economics to imply that no firm can earn “excess profit” in a competitive market where individual firms do not have enough market power to influence the price. The no “excess profit” or zero profit condition is easy to prove when the firms in an industry are identical and small relative to the market size. When they are not identical, some firms may be more profitable than others. Therefore, a trick has to be employed to preserve the zero profit condition by calling the profit earned by more productive firms “economic rent” attributable to their extra productivity or competitive advantage. Since this competitive advantage, or extra productivity, is part of the firm’s productive resources employed in the production process, conceptually it must be compensated the same way as other resources used in production; its payment is termed “economic rent.” Once the compensation for this competitive advantage is accounted for as part of the production cost, the “excess profit” disappears and the zero profit condition is restored. The new concept of profitability that is net of economic rent is called economic profit, to distinguish it from the concept of accounting profit used by non-economists. While “economic rent” that eliminates the “excess profit” is but a side note in microeconomic theory, how to create competitive advantage and to increase “economic rent” is a big subject in business schools.

For people who are not trained in economic theory, the exercise to preserve the zero profit condition may look like pure word play. It is not. The concept is very useful in understanding the efficiency of resource allocation under different market structures or economic institutions. However, it would be the wrong concept to employ if a firm’s management is to decide whether it is worthwhile making an extra effort or to improve its productive efficiency in order to increase the firm’s profitability. As a result, it does create confusion sometimes. People can easily fall victim to the two different concepts of profitability, using the modified concept of profitability, or economic profit, to draw zero profit conclusions, then switch to the unmodified concept of profitability, or the concept of accounting profit, when inferring the implications from the zero profit conclusion.

For these reasons, it is important to keep in mind the content behind the terminologies when there are different views with regard to the concept. This is especially so when the meaning of the technical terminology used by the professionals differs from its everyday usage. The concepts of “zero profit” and “efficient market” are such examples. Lots of time and effort can be saved and discussions can be made more

productive if attention is paid to the content of a concept or a theory and the relevance to the issues at hand, instead of focusing on the different interpretations of the concept or theory. For example, faced with the same statistical evidence, different people may draw different conclusions about its implications for the EMH, often with very different definitions in mind for what is meant by EMH. In this case, instead of using the EMH as a stepping-stone to other issues of interest, going directly from the statistical evidence to the other issues may be a much better choice.

In terms of the zero profit condition, the right understanding of the two profit concepts and their applicability in addressing different issues are clearly displayed in the separation of the focus between the economics department and business schools. In the economics department, economic profit is taken as the right profitability concept for the study of efficient allocation of resources; the zero profit condition is accepted as a fact of life in competitive industries. On the other hand, in business schools, the accounting profit concept is accepted; the art of creating competitive advantage to increase profitability is taught with the support of both theory and practical case studies.

The logic behind an activist approach in seeking to increase accounting "excess profit" in other industries should offer the same justification to taking an activist approach in the financial market. It is somewhat surprising, therefore, that the same separation of research focus has not been achieved in terms of teaching and research of the financial market. Instead, the EMH has dominated the thinking in both economics departments (or finance departments) and business schools. While firm fundamental research for stock market analysis is taught at business schools, it is done with far less confidence as a tool for seeking competitive advantage through an active approach to investment management, as compared with the strong conviction displayed in teaching competitive strategies for other industries. Furthermore, technical analysis is generally not taught at business schools despite the fact that justifications for an active investment approach through firm fundamental analysis should work equally well for technical analysis. With statistical evidence and theoretical arguments accumulating on forecastable patterns in the stock market, it is time to make the same kind of separation for EMH as being done to the zero profit theory in microeconomics. Let the EMH stay in the economics or finance departments as a good description of the financial market, without being constantly challenged by the fact that there are opportunities to make profit in the financial market. At the same time, let business schools

research and teach how to take an active approach to investment management and seek profitable opportunities in the financial market, through fundamental as well as technical analyses.

## **9.2 EFFICIENT MARKET HYPOTHESIS— THE EVIDENCE**

In discussing EMH the main implication is to infer whether an activist approach to financial market investment is justified. The debate on EMH, however, has evolved very much into a matter of definition as increasing amounts of statistical studies have cast the associated random walk theory into serious doubts. To be productive, it is therefore important for the discussion to get away from the name game. Instead of debating about whether EMH holds, the attention should be focused on the relevant empirical evidence and theoretical analysis, and what implications can be drawn from the empirical evidence and theoretical analysis for an activist approach to financial markets. The following is a summary of the reported empirical evidence that has turned the tide against the random walk theory.

1. Small firm effect: For the period of 1936–75, Banz (1981) documents that excess returns can be made by investing in stocks of low capitalization companies. Reinganum (1981) shows that the small firm effect persists even after adjusting the returns to account for a higher risk of small firms.
2. P/E ratio effect: For the period of 1957–77, Basu (1977) discovers higher returns can be earned by holding a portfolio of stocks with low price-to-earning ratios than a portfolio consisting of the entire sample of stocks.
3. P/BV ratio effect: Similar to low P/E ratio effect, stocks with low price-to-book value ratios are also shown to generate higher returns on average than the broad market.
4. Dividend yield effect: According to Fama and French (1988) and Campbell and Shiller (1988), the initial dividend yield (dividend-to-price ratio) of the market index can be used to forecast as much as 40 percent of variance in the stock market returns.
5. The January effect: Based on the performance of the NYSE stocks for the period of 1904–74, Rozeff and Kinney (1976) reveal higher-than-average stock returns in January than in other months.

The result of higher January returns has been extended to other countries and the bond market. The phenomenon is explained as being caused by the end of the year selling of loss-making stocks for tax reasons. The concentrated selling of those stocks depressed the price at the end of the year and leads to higher returns in January.

6. The weekend effect (or Monday blue effect): For the period of 1953-77, French (1980) shows that stock returns tended to be negative on Monday whereas they are on average positive for other days of the week. Similar evidence has been found in other countries. But later studies suggest that the weekend effect may have disappeared in more recent years.
7. Turn-of-the-month effect: various studies (e.g., Lakonishok and Smidt, 1988), have found that the return of stocks are higher at the turn of the month, defined as the last few days of a month and the first few days of the next month.
8. Pre-holiday effect: Several studies have shown that stock market returns are generally higher on the day before holidays.

While the random walk theory is neither sufficient nor necessary for EMH to hold, this has not de-linked the random walk theory from EMH. The random walk theory continues to be regarded as the testable implication of EMH and has been the focus of much of the empirical research on the hypothesis. However, the accumulating evidence against the random walk theory has not weakened the support for EMH. The defense of EMH is mainly based on two arguments: first, the profit from the observed patterns is too small to be exploitable; second, the failure of the random walk theory from time to time is due to chance events. According to the argument, the market is informationally efficient in the sense that no systematic errors are made at the equilibrium that leads to exploitable profit opportunities.

If interpreted correctly, it is almost a truism to say that the market is not too far away from being informationally efficient. Visible profitable opportunities will be exploited quickly. To beat the market is no easy business. Therefore, empirical evidence alone is unlikely to be enough to disprove the hypothesis convincingly for the believers. What is important to recognize, however, is that opportunities do exist and the market does deviate from the intrinsic value. For our purpose here, whether the deviation is systematic or not is not material, for it is just a matter of how the information set is defined.

As long as there is discrepancy between market prices and the true valuation, it is possible to be exploited. For example, suppose EMH is accepted as true; the discrepancy is non-systematic. With rare exceptions, people will still accept it as a fact that private information can lead to profitable market opportunities. What appears to the general public as non-systematic deviation from the market true valuation is systematic discrepancy exploitable for profit in the eyes of the people with access to private information. Those with superior analytical skills or superior analytic models can be regarded as having private information; people who work hard to obtain new insight into market valuation can be regarded as having private information. What appears to be non-systematic deviation of the stock prices from the true valuation can offer systematic opportunities exploitable for profit for these people.

Former theoretical modeling also supports the point that there are exploitable opportunities in the financial market. Grossman (1976) and Grossman and Stiglitz (1980) take issues with the concept of information efficiency as stated by EMH. They argue that if the market were informationally efficient in that at the equilibrium the current price fully reflected all information about future price, then paying for information would generate no compensating returns and no one would engage in costly information gathering. But if no one gathers information, then the equilibrium price cannot be expected to reflect all the information; as a result, there will be an incentive for someone to gather information. This paradoxical result shows that an informationally efficient market, i.e., what is asserted by EMH, cannot hold. An “equilibrium of disequilibrium” was then proposed by Grossman and Stiglitz where the market is in continuous disequilibrium in the sense that positive returns can be earned to provide incentives for information gathering and costly arbitraging; but the market can be considered in equilibrium at the same time in the sense that the positive returns will be just enough to compensate for the total cost of engaging in arbitrage trading.

EMH needs to be modified to survive. Lo and MacKinlay (1999) have a proposal; the market is still efficient, because no “excess profit” has been earned. Even when the profit of arbitraging more than covers the complete cost of engaging in such activities, the profit can be attributed to “economic rent” payable to the competitive advantage of the successful arbitragers. As a result, the zero profit condition is once again maintained.

In fact, if the goal is to produce the zero profit condition, there is another way to generate the result. One may argue that the “economic rent” due to “competitive advantage” generated by activities such as the discovery of new financial technology, will attract competition to invest in such activities. At equilibrium, such competition will result in the “economic rent” to the competitive advantage falling to a level just enough to compensate for the cost of creating such a competitive advantage. Therefore, aggregated over time with future profit properly discounted, the profit should not be positive and a dynamic version of the zero profit condition is established.

The restoration of EMH with a different content attached to it may be a useful exercise if the concern is about the institutional design of the financial market. However, it should not fool us into thinking that the new version of EMH carries the same implications for active investment management and technical analysis as the original EMH. It is important to note that under the new EMH, extra profit can be made in the market if extra resources are devoted to discover arbitrage opportunities, or if one has already developed a competitive advantage. According to Lo and Mackinlay’s definition of EMH, one may earn positive profit in trading or investment to compensate for higher cost, which may include working harder than other people; or one may earn positive profit in trading or investment as “economic rent” for one’s talent, or unique insight developed about the stock market.

Similarly, in the dynamic version of EMH, one may earn positive profit by working harder either in developing new analytical tools or in applying the privately developed tools to design trading plans. The profit is the compensation for the hard work. Furthermore, one may earn “dynamic economic rent,” i.e., net profit when the cost of financial innovation, trading cost and profit are aggregated over time. This can be achieved if one has developed a “competitive advantage” in carrying out innovation activities for better financial technology and a more accurate understanding of the financial market.

The key conclusion to be reached from the above discussion is that the zero profit conditions in the financial market are no different from that in other industries. It is a good description of the broad industry conditions. But it does not mean that one cannot do better by working harder or more intelligently in the financial market. Therefore, EMH should be maintained at the economics or finance departments, while fundamental and technical analyses are taught and researched at business schools, and carried out by investment professionals.

### 9.3 EMH, MARKET ACTIVISM AND THE \$100 BILL STORY

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The existing theoretical and empirical research provides good reasons to be positive about active investment management and technical analysis. The case can be further strengthened by looking directly at what is wrong with interpreting EMH as implying that market activism is not advisable. In fact, the logical inconsistencies are not difficult to point out, and they can be clearly illustrated by the old story about an economics professor, his student and a \$100 bill. A professor and his student walk in the street and they come upon a \$100 bill on the ground. As the student stops to pick the bill up, the professor says, "Don't bother. If it were a real \$100 bill, someone would have already picked it up."

The professor's logic clearly has gone awry somewhere as the conclusion is wrong and the \$100 bill is real. In fact, the professor commits the same logical mistake that is at display when EMH is used against market activism. To be more specific, there are two logical inconsistencies in the professor's reasoning. First, he uses the concept of rationality inconsistently. The professor reaches the conclusion that there cannot be a \$100 bill on the ground by assuming that all other passers-by are rational (and ahead of the student), but at the same time, he dismisses the student as irrational when the student sees the bill and attempts to pick it up. Alternatively, the inconsistency can be seen by the fact that if the advice from the professor is given to everybody, then the bill would always be on the ground and the advice given to the student would be wrong. Second, in economics terminology, the professor considers no real bill being left on the ground as the state of equilibrium. But he uses the concept of equilibrium inconsistently. He employs the equilibrium definition as a state of no real bill being left on the ground to infer that the student is making a useless effort to pick up the bill; but he forgets that by definition, if the student sees the bill on the ground, then the equilibrium has not been reached. Put in different terms, the professor is assuming his conclusion.

Similarly, when EMH is used to dismiss any attempt at active investment management or attempt at analyzing the direction of the stock market, the adherents of the hypothesis are making arguments that suffer from two logical inconsistencies. First, the argument is inconsistent in employing the rationality concept. It assumes that rational profit-seeking actions of investors and traders drive the market to equilibrium where further profitable trading and investing opportunities are exhausted. At the same time, when traders and investment



managers see profitable opportunities in active investment management and arbitrage trading, they are judged to be irrational. Looking at the issue from a different angle, if everybody follows their advice to act “rationally” and does not engage in active investment management or arbitrage trading even when they see profitable opportunities, then the market would not converge to equilibrium and it would be profitable, thus rational for investors and traders to exploit the opportunity. Second, the equilibrium concept is not used consistently in the argument. Equilibrium is a state where nobody sees opportunities for profitable trading. Combined with rationality, this definition of equilibrium leads to the inference that nobody can trade profitably. However, the same definition of equilibrium is not used to judge whether the equilibrium has been reached. When people still see profitable opportunities for trading, equilibrium has not been reached. Therefore, the inference is made on mistaken assumption.

If the rationality and equilibrium concepts are used consistently, EMH should not be taken as implying that active investment management or arbitrage trading cannot be profitable. Instead, the following interpretation is the correct inference. When a person does not have a good reason to believe that he can trade or invest for profit, he should not take an activist approach to trade or invest. Anyone who has done serious trading or investment in the stock market knows that this is indeed good advice. In fact, it should be regarded as the cardinal rule of market activism.

In response to the above criticism, further interpretation of the story can be advanced in favor of EMH. It can be argued that even if the \$100 bill is real, it does not happen with any regularity; it is the exception that should not be used to prove a rule. The problem with this argument, however, is that there are constant exceptions in life; actively taking up the opportunities that present themselves is the rule that can make a big difference. Similarly, in the stock market, the exact same opportunity may not present itself twice, but there are countless other similar opportunities emerging constantly to support an activist approach.

## **9.4 FLAWED EMPIRICAL OBSERVATIONS AGAINST MARKET ACTIVISM**

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There are several well known empirical observations that have been used to dismiss active investment management or any efforts in trying to beat the market. But upon closer scrutiny, it is clear that the arguments made based on those empirical observations are flawed.

**The dart vs. professionals contest:** The best known empirical observation against market activism is the dart vs. investment professionals contest organized by the *Wall Street Journal*. In the contest, stock picks of investment professionals over a period of several years failed to outperform the picks made by a randomly thrown dart. Keeping in mind the cardinal rule of market activism that actions should be taken only when clear opportunities are seen, it is not difficult to see that the contest was not properly set up to test whether the investment professionals are equipped with knowledge for making profitable investment decisions. Instead, it tests whether the professionals can constantly see profitable investment opportunities. They are forced to make choices every time regardless of whether they see a clear winner or not. This goes against the rule. The resulting increase in volatility explains the failure of the professionals to beat the market. The result will be completely different if the *Wall Street Journal* reorganizes the contest so that the professionals are given the freedom of making a pick only when they see clear winning strategies. The following is a proposal for a reorganized contest.

1. Restrict the choice pool of the stocks to a specific industry, industry group or the component stocks of a market index to make the information processing more manageable and accentuate the knowledge and skills of the investment professionals. Let the investment professionals know the universe from which they will make their stock picks before they make a decision to join the contest. This is to make sure that the professionals' expertise matches with the stock universe. Or better yet, let each professional make his own pick of the investment universe.
2. Set the contest for a period of three years (or whatever period specified), long enough to allow the professional skill to transpire over the inherent uncertainty.
3. At a pre-determined time interval, say, once a month, the dart is thrown at a given number of stocks.
4. The professionals are allowed the same number of stocks in their basket as the dart, but they can change their pick at any time with the trading cost included in calculating their performance.
5. Most importantly, the professionals are given the option of either going with the dart choices when they do not see clear winners, or making their own picks when they see a clear winning strategy.

Under this setup, good, experienced investment professionals should not find it too difficult to win the contest.

In fact, the concept behind the modified professionals vs. dart contest might be what led to the idea of the enhanced index fund. Unfortunately, with an average annual turnover rate at about 100 percent, enhanced index funds have deviated from their initial motivation and do not really follow the rule of acting only when there is a clear winning strategy. But the potential for such a concept of disciplined market activism, when closely followed, can be significant. The merit of such a concept can be clearly seen by the far better performance of enhanced index funds when compared with the broad market index in the 2007–08 financial market crash. The sharp declines during the crash provided a unique opportunity where experience and knowledge about the market dominated other random factors as well as the tendency of over-trading, leading to the out-performance of these funds. For 2008, according to data from Morningstar Inc., the broad US market measured by S&P 500 fell by 37 percent; the average return of the index mutual funds declined by 33.4 percent; but the enhanced index fund fell by a notably less 27.3 percent.

In normal times, however, to fully realize the potential for gains from disciplined market activism, the incentive for the fund manager to stick to the concept has to be correctly set up, and the principle of deviating from the index only when the manager has strong confidence in doing so has to be guaranteed with hard discipline. The enhanced index fund does not provide enough such hard discipline. To rectify the problem and provide a concrete example of the potential for market activism, a new type of fund, the index plus fund, will be discussed later. The index plus fund will adopt the same strategy as that of the enhanced index fund of targeting to outperform the index fund at the margin, but with hard disciplines imposed to make sure that no excessive risks are taken.

**Mutual fund underperformance:** The second empirical observation that has been made against active investment management is that more than half of the mutual funds have underperformed the broad market index. But this is not really unexpected, for two reasons. First, more than 90 percent of trading is done by institutional investors. So the professionals are competing against each other. Second, the stock market is a place where only a few winners take all. The easy opportunities for profit are quickly exploited by a small number of best performers. Together the above two factors imply that the number of the mutual funds that outperform the market index is expected to be less than the number of mutual funds that underperform the market index.

Some studies have shown that on average, mutual fund managers have earned just enough profit to compensate the fees they charge.

Questions are raised about the methodology used in those studies, especially survivor bias that may exist in the studies. Further research may be required to have the issues clarified. But even if the mutual funds on average underperform the broad index, it cannot serve to dismiss active investment management. As a result of the different overall risk profile faced by each individual, many investors may wish to invest in a portfolio that is different from the market portfolio. This may lead to lower expected returns in some of the mutual funds being offset by their function of providing needed diversification tools for investors. For one reason or the other, as a matter of observed fact, diversifiable risks are still compensated for. Thus, not all the mutual funds serve a single-minded purpose of "beating the market." To measure all the mutual funds against such a criterion may not be the right way to judge mutual fund performance.

**Patterns from coin flipping and chartists:** The most amusing evidence against stock market analysis, technical analysis specifically, was provided by Burton G. Malkiel in his wonderfully written and immensely successful book, *A Random Walk Down Wall Street*. It is a story about a chart and a chartist. Professor Malkiel's students produced many "simulated stock market patterns" by throwing coins. He once took a very bullish chart pattern produced by those "simulations" to a chartist friend. The chartist "jumped out of his skin" and followed with, "We've got to buy immediately." When told how the pattern was produced, his poor chartist friend was not amused. But Professor Malkiel and many of his readers, the author included, had a good laugh afterward. Good humor aside, does it prove the point that the path taken by the stock market is just the result of random walks and that chartists just do not get it? The answer is: no, it does not.

Suppose for a moment that the stock market indeed is predictable and the patterns used by chartists are all 100 percent accurate. Now ask the following question: will the students of Professor Malkiel be able to produce each and every one of the patterns by throwing coins? The answer is: yes, if they try enough times. In fact, it is neither easier nor more difficult to produce these patterns with flipping coins under two different circumstances: stock market movements being random and stock market movements following predictable patterns. The fact that the path can be replicated with random coin flipping says nothing about whether or not the original path is produced by random movements itself.

To further illustrate the point, consider throwing a dice to decide the direction of movements in a three dimensional space. If enough

trials are made, eventually any path on earth can be reproduced. The path of the highway from New York to Washington, for example, can be produced in this way and mapped to a paper. If the chart is taken to a trucker who runs the route regularly, he will tell you immediately that this is the highway from New York to Washington. However, he would be wrong because the chart is produced by throwing a dice. But this does not mean that he gets from New York to Washington or from Washington to New York every time by random walks. To match Professor Malkiel's story more closely, suppose the dice throwing is made to produce 80 percent of the path of the highway from New York to Washington; the resulting chart is shown to the trucker and he is asked if he can "forecast" what is ahead. Recognizing the path is the same as that of the highway from New York to Washington, he will likely state with confidence that he knows every twist in the extension. Again he is wrong, because the extension, to be produced by throwing a dice, will most likely not reproduce the 20 percent route remaining between New York and Washington. But this does not mean that the trucker's claim to be able to get from New York to Washington according to the map (or pattern) in his head is false.

**Inconsistency in mutual fund performance:** The fourth observation made against active investment management is the inconsistency in the performance of mutual funds. Earlier studies show that good performance of managers in one decade in terms of their ranking in portfolio returns does not carry over to the next. More recent studies reveal that the inconsistency is manifested in an even shorter period; one year's good performance does not necessarily imply a good performance for the next year. This is taken as indicating that the mutual fund managers really do not know what they are doing; they do better or worse purely on good or bad luck. While mutual fund managers being a useless bunch can produce the results, it is not the most likely reason for the inconsistency. Given their training, their pay and indeed their very existence in a free market environment, the null hypothesis has to be that they do perform a valuable service to their customers. To conclude otherwise, one needs to have stronger evidence, exhausting other possible explanations rather than merely providing a hypothesis that is consistent with the empirical observation.

There are several likely explanations for the inconsistency in mutual fund performance under the null hypothesis that fund managers do possess skills and knowledge to justify active investment management.

First, no mutual fund managers know everything about the market and the market may be driven by different factors in different periods. The managers that have knowledge about the main factor behind the current market movement would top the performance table in the current year. If the factors driving the market change the next period, be it the next decade or the next year, then the performance table is expected to change accordingly, drawing to the top a new group of fund managers that are the best in decoding market movements driven by the new factors. The inconsistency in fund managers' performance is thus a reflection of the changing market conditions and the fact that nobody knows everything about the market.

The skills and knowledge of fund managers are multi-dimensional. Different skills and knowledge may be of different importance in decoding the factors driving the market in different situations over different periods. Therefore, conceptually, fund managers cannot be ranked according to their skills and knowledge without knowing under what market condition the ranking is evaluated. Accordingly, the performance ranking is not expected to be the same in all market conditions over different periods.

The analytical framework presented in this book points out many pausing points on the way up and similarly, numerous countermovements on the way down. When the market moves towards different directions either permanently or just for the short run, the factors affecting market performance may change accordingly. Additionally, it has been argued that the effective bull and bear market range is bounded; beyond the effective range, factors behind higher order time intervals will take over, potentially bringing in a new set of factors as the dominating force behind market movements. As a result, the fund managers with a given skills and knowledge base are likely to see their performance ranking fluctuate as the market goes through effective ranges of different time intervals, and as the market makes periodical countertrend movements.

The specialized knowledge and skill base of individual fund managers is well reflected in and the impact of which is exacerbated by the style approach. The style approach to active investment management is widely practiced in the industry. The particular style chosen by a fund manager, or the other way around, the particular manager chosen for a fund with a given style, is likely to reflect the manager's strength in his related skill and knowledge base. But once the manager is assigned to a fund with a particular style, most times he is forced to focus on a narrowly specified technical approach to fund management.

Thus, in addition to the manager's specific knowledge base, the fund style further ensures that the manager will not be able to adapt to changing market conditions. The fund's relative performance is largely left to be randomly decided by whatever factors will be dominant one in the market place.

Second, over an extended period, the good performers are likely to lose their edge because of the catch-up effect. Being top performers for consecutive years is likely to attract scrutiny of their investment strategies. The longer the out-performance periods, the more data will be available for study by other fund managers. Sooner or later, the secret will become open knowledge and the competitive edge is lost. As a result, the performance deteriorates and the ranking drops. What can be concluded is that a particular way to actively manage investment will not stay effective forever. But this does not provide an argument against active investment management itself for there are always new winning strategies to be discovered.

Third, perhaps most importantly, the incentive structure of the mutual fund industry is not set up correctly. In general, allocative efficiency requires that the risk of a transaction is borne by the party with more information about the risk and having more control over the risk. However, in the mutual fund industry, all the risk is borne by the less informed investors with no control over the risk being taken. Therefore, the incentive for the managers to exert their best judgment is seriously distorted. Not only does bad performance have no direct financial implications for fund managers; Stefan Ruenzi and Alexander Kempf (2003) show that bad funds are not even punished appropriately by outflows of money under management. This is likely due to the cost of switching from one fund to another and the difficulty for the investor to distinguish a good fund manager from a bad one.

On the other hand, top performers are disproportionately rewarded with more business, with funds in the top 20 percent during a year picking up 10 percent more business than funds in the next 20 percent; below that, fund performance does not make much difference, according to the study.

This skewed incentive structure leads fund managers to take on too much risk in order to beat the relevant index, beat the market and beat the manager crowd. As a result, significantly more randomness is injected into the ranking table of the mutual fund performance, contributing to the performance inconsistency.

The first two sources of fund performance inconsistency really should not be cause for concern, but the skewed incentive structure in

the fund management industry should be addressed for the benefit of both investors and good fund managers. Getting the incentive structure right is an area where productive steps can be taken to increase the allocative efficiency of the fund management industry and the consistency of fund performance. Investors, regulatory agencies, as well as good fund managers should join forces to work towards a more balanced incentive structure.

## **9.5 A FUND TO SHOW EFFECTIVE MARKET ACTIVISM**

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In fact, the success of the index fund, it can be argued, is due to the fact that the incentive distortions in the actively managed funds are being taken out once a passive strategy is adopted. The success is achieved not because of the passive strategy as many have believed, but rather, it is achieved despite the disadvantage of the passive strategy. This is because the gains from taking the incentive distortion away offset the loss from adopting a passive investment style.

With hard disciplines understood as the reason for the success of the index fund, it makes good sense to go a step further to upgrade the index fund and adopt a system that maintains strong disciplines while taking advantage of the benefit from an activist approach. This is the idea for the index plus fund to be described here. Based on the fact that the expertise of every fund manager is likely to be limited to some specialized areas, the index plus fund will select an appropriate index as the reference index to match the fund manager's specialized knowledge and expertise, and set a target to outperform a reference index by a stated margin. Compared with the index fund, the index plus fund will relax the strict prohibition of active portfolio management, but find other ways to prevent unwarranted risk taking by imposing hard discipline, to be detailed shortly.

This may sound like the enhanced index fund already being offered by many fund managers, but it is not. Enhanced index funds may have started with the same idea or something close to it, but they have become no different from other actively managed funds with the exception that the enhanced index funds restrict the stock picks to a universe of component stocks of the reference index. The index plus fund differs from the enhanced index fund in two important ways. First, the fund managers of enhanced index funds still have all the freedom in taking on unwarranted risks as long as they restrict their stock picks to the component stocks of the reference index. They can bet the investors' money without worrying about the consequences if



the high-risk bet goes wrong. As a result, enhanced index funds, like other mutual funds, do take on too much risk and employ some risky strategies as long as the investors can be convinced to part with their money. Second, while the component of the reference index will still be the core of index plus funds, restriction will not be placed on the selection of stocks from outside of the index component universe. This is because more effective disciplines will be imposed to make sure that a fund manager deviates from the reference index only when he has a clear winning strategy.

There are two ways hard disciplines can be imposed on an index plus fund. A simple approach is to use an enhanced index fund as a starting point, but make a binding commitment to cut down the turnover rate from the current 100 percent to, say, 50 percent. A more sophisticated approach is to let the fund manager bear some or all of the downside risk if the fund underperforms the stated target by a statistically significant margin. The first approach is a quick and simple-minded approach not designed to provide the best fit to every fund manager's particular skill and knowledge profile. But it should be an improvement from the enhanced index funds being offered right now. The second one needs some elaboration.

Under the second plan, each year, every manager picks his reference index and announces targeted return normalized by the return of the reference index, i.e., the difference between his return and the return of the reference index. Also to be announced is the variance of the normalized return. Assuming normal distribution in the normalized return, one-sided 5 percent and 1 percent p-values are calculated and announced at the beginning of the year for testing whether the fund underperforms the target by a statistically significant margin at the end of the year. If it does, the fund managing institution will partially compensate the difference between the actual return and the index return (or the targeted return) in the case of the normalized return falling below the 5 percent p-value. The fund managing institution will fully compensate the difference between the actual return and the index return (or the targeted return) in case of the normalized return falling below the 1 percent p-value.

This stated return target and the variance of the fund return will provide investors with more accurate information about the true capabilities of fund managers for two reasons. First, the fund manager will be prevented from stating a too ambitious return target for fear of being punished with a compensation payment if he cannot deliver. The fund manager is the best informed about his own capability in making the right investment decisions and generating outperforming

returns. Second, the high return of an investment fund in the previous year on chance events will no longer affect investors' evaluation of the fund's expected return this year as the stated return target by the fund manager for the current year is a better indicator of the true ability of the fund manager. The fund manager, who understands whether the good performance last year was due to good luck or his capability, will not allow the good luck factor to affect the target setting for the current year as it is in his own interest to reveal the truth, given the punishment if he underperforms the targeted return.

The fund manager will be discouraged from taking on high risk, betting his chances on investors' money, for two reasons. First, a high-risk strategy will increase his chance of falling below the p-values and therefore increase his chance of getting punished. Second, a good performance this year due to good luck will have no effect on his ability to attract investors next year as his stated target, rather than this year's performance, will be used by investors to evaluate his expected performance next year. As a result, the skewed incentive plaguing the fund management industry will be rectified.

While it may be tempting for some fund managers to state a big variance in the hope of fooling statistically challenged investors into accepting more risk, the p-values will provide a straightforward, easy to judge indicator for investors, preventing that from happening.

Obviously, the managers without good fund managing skills will not wish to enter into such a system voluntarily. So there are two ways such a system can be installed: by regulatory changes initiated by the market regulating agency requiring all the fund managers to adopt such a system, or by voluntary actions of the good managers to differentiate the industry into two groups of managers, the good ones who voluntarily adopt such a system and the bad ones who do not adopt such a system.

In the case of regulatory changes requiring all fund managers to adopt such a system, the performance of the fund managers should be evaluated according to a modified system. Under the modified system, the performance-ranking table should be based on the low of the stated and realized returns, adjusted by the high of stated and realized variances.

Without initiatives from the regulatory agencies, it is in the interest of the good managers to voluntarily adopt such a system. The problem faced by good fund managers and investors alike is that under the current system, bad managers can compensate their lack of skill and knowledge by taking on more risk without worrying about

being punished if the risk materializes into bad losses. With enough bad managers taking on big risks, some bad managers will rake up good performance numbers just by chance, obliterating the skills and performance of good managers. It is difficult for investors to judge fund management skills and fund performance records. However, it is relatively easy to judge which incentive structure serves better to encourage responsible investment management. So, by adopting a more incentive-compatible reward/punishment plan that imposes hard financial discipline, good fund managers can separate themselves from the bad ones.

In case the industry is divided into two groups as a result of good managers voluntarily adopting such a system, apparently, the two groups should be ranked separately. The modified performance system should be applied to the good manager group. Under such a scenario, investors will be greatly helped in their ability to differentiate good performance from pure luck in the performance of fund managers. Good fund managers will be rewarded for their skill and knowledge, not hampered by the misinformation created by bad managers taking on too much risk.

Do good managers have to move all together in order for the proposed index plus fund to work? Not necessarily. The average return of actively managed funds is not much different from the broad market index, but the return of individual funds spans a wide range. Thus for investors who care only about volatility adjusted return, an index plus fund managed by good managers with market beating skills is clearly a better choice than the other actively managed fund not constrained by hard financial discipline, with the former coming with higher expected returns and reduced volatility. If the successes of the innovative Index Fund and the half-baked Enhanced Index Fund are any indication, the Index Plus Fund should be a predictable winning strategy for good fund managers.

The index plus fund proposed above, if adopted, should go some distance to increase the performance-ranking consistency of fund managers. But due to the other two reasons discussed earlier, lasting stability in fund managers' performance ranking is unlikely. The proposed system is not an effort to achieve performance-ranking stability of fund managers, but rather it is a step ahead from the tremendously successful idea of the index funds, to exploit the true knowledge and skills of the fund managers. This is based on the understanding that such specialized knowledge and skills do exist, but they have to be employed with a high degree of discipline. Otherwise, the value that

can be created by such knowledge and skill can easily be offset by undue risks taken by the managers, voluntarily or forced by competitive pressure.

## **9.6 A THEORETICAL ARGUMENT FOR TECHNICAL ANALYSIS**

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Earlier discussions established that EMH, even in its original form, cannot be used as the theoretical justification against people engaging in active investment management if they see opportunities to do so profitably. In section 9.4, it is further shown that the empirical observations against market activism are flawed. The empirical observations, however, highlight one important problem associated with active investment management: excessive risk taking. This is not a problem caused by active investment management per se, but rather an unintended consequence of the currently adopted incentive structure in the fund management industry. Section 9.5 proposes a practical strategy, the index plus fund, to address the problems so that the rationale for market activism can be fully exploited without the obstruction from the unintended excessive risk taking.

While existing theoretical and empirical research has provided support for an activist approach in the financial market by rejecting the mistaken interpretation of EMH, market activism, especially the pursuit of technical analysis, is still in need of a positive theory. This section is an attempt to provide a theoretical argument for market activism. Since this book is about technical analysis and there has not been a serious theoretical argument being presented to justify the approach, the focus here will be to provide sound theoretical arguments to support the fundamental notion underlying technical analysis, that the historical path taken by the market matters for forecasting the future.

First, the stock market does not move just on economic fundamentals. To a certain degree, it works in a way characterized by Keynes as similar to judging a beauty contest, "in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole." More recently, behavior finance theorists have modeled the stock market on psychological factors, social movements, noise trading, and fashions or "fads" of irrational investors (e.g. La Porta, Lakonishok, Shliefer, and Vishny [1997]). It should not be controversial to state that stock

market prices are not just influenced by fundamental factors. Among other factors influencing the market, the view of the market participating crowd is very important. Historical bubbles such as the Dutch tulip-bulb mania, the British South Sea bubble and Japan's real estate bubble highlight the importance of being influenced by other people's views in the asset market.

Obviously, fundamental considerations are also important, as asset market mania does not happen every day. People do not value an asset purely according to the popular view in the market. The intrinsic value of the asset does provide an anchor for the market price most times. However, other people's views are important due to two factors. First, demand and supply are important factors to consider. In making an investment decision, the most important question to ask is: Will someone pay a higher price for the asset than I am paying now? It is sometimes called the "greater fool" approach – as long as there is a greater fool who is willing to pay a higher price than I am willing to pay for an overvalued asset. Second, nobody has all the information or skill to understand everything that affects the value of an asset. Therefore, most times, one needs to draw on other people's valuation of the asset to infer its true value.

While the behavioral finance is quick in assuming that people are not rational all the time, complete irrationality is also not a reasonable description of the reality. Instead, bounded rationality is likely a good starting point in characterizing the behavior of market participants. Faced with great complexity in stock market valuation and with limited capacity to acquire and process information, people adopt simplified rules that work the best on average over a long period of time. Using other people's views to update one's own judgment about the market condition can be viewed as such a rule under bounded rationality.

There are many different factors affecting the stock market, nobody has all the information about exactly what is the true market value, but most people, especially investment professionals, probably know something about the market from different perspectives. Therefore, it is reasonable to assume, under most market conditions, that other people's views are valuable not just for its demand and supply implications as in the "greater fool" theory, but also for its function in providing information about the intrinsic value of the underlying assets.

The argument that market interaction has important information content is consistent with the empirical evidence that the stock market prices do not adjust instantly to new equilibrium. Actions by market

participants in reacting to news may provide information about the true impact of the news on market valuation, generating further reactions in the market before equilibrium is reached. Thus, it takes time before all the impact of the news on the market has been reflected in the price and arbitrage opportunity is exhausted.

For evidence of an extended period of reaction to news, see Ball and Brown (1968); Chan, Jegadeesh and Lakonishok (1996) and Fama (1998). The above authors document continued rise (fall) in a firm's share price, on average, for a substantial period after the announcement of an unexpectedly high (low) profit. As mentioned earlier, Grossman, and Grossman and Stiglitz made theoretical arguments that the equilibrium where all the information is reflected in market prices cannot be reached instantaneously.

Most times, enough people know enough about the intrinsic value of the asset to prevent a bubble from forming in the process of price discovery. But under two conditions, a bubble may form. First, there is great uncertainty about the value of the underlying assets. Therefore, market participants rely heavily on other people's views in assessing the value of the asset. Second, the uncertainty about the aggregate value of the assets is large enough to allow a large number of people with little experience of the asset market into the market. Because these people have little understanding of how to evaluate an asset, their participation in the market increases the uncertainty perceived by the average investor active in the market place, leading to further dependence on other people's valuation and increased room for price deviation from the intrinsic value of the asset.

At a certain stage, the deviation of the price from the intrinsic value of the asset may be large enough to go beyond the risk-bearing capacity of knowledgeable arbitrageurs, as argued by Shleifer and Vishny (1997). This leaves the market increasingly populated by people without much knowledge about the asset market and therefore facing greater uncertainty in evaluating the true value of assets, creating ever increasing dependence on other people's views and more room for a deviation of the price from the true value of the asset.

The bubble gets bigger and bigger until the risk-bearing capacity of the uninformed runs out; or the bubble may come to the end when it becomes increasingly clear even for the less informed people that the market price cannot be supported by any reasonable valuation of the underlying assets. Negative external events may prompt such a reassessment of the market valuation, but bad news is not always necessary for the bursting of the bubble. On the way down, the same uncertainty about the asset valuation and resulting reliance on market

action for assessing the intrinsic value leads to quick downward valuation adjustment and sharp declines.

The lessons about bubble formation can serve to inform us about everyday price formation as well. Because of their limited knowledge base, during normal times people also need to draw on the information revealed by market interaction to update their views about the true market fundamentals.

It can be further observed that market interaction does contain helpful information content. This is because market participants have limited capacity to bear risk and most people face constraint on borrowing even before they reach their risk-bearing capacity. As a result, most people do not take on leveraged positions even if they believe the market is not properly valued. For individuals and institutions that do take on some leveraged positions, they reach their limits fairly quickly relative to the size of the market. Therefore, the fact that an individual or institution is not bidding up the price is not an indication that the price is believed to be properly valued or overvalued. Similarly, when an individual or institution is not selling or taking short positions on an asset, it is not an indication that the asset is believed to be fairly valued or undervalued.

It follows that the level of the price alone is not a perfect reflection of aggregate views about market fundamentals or about the true value of the stocks. It is merely a reflection of the balance between the amount of capital behind those who view the market as overvalued and those who believe the market is undervalued. Furthermore, it does not carry the information about the difference between the average margin of the believed undervaluation and the average margin of the believed overvaluation, not mentioning the distribution of the perceived undervaluation and overvaluation on the two sides of the market respectively.

To make the long statement short, the price is a reflection of aggregate demand and supply, which does not correspond exactly to the aggregated market views about fundamentals. This leaves room for the path taken by the market to provide useful information about an aggregated view of the market fundamentals.

Direct empirical observations support the notion that market demand and supply conditions are not perfectly correlated with aggregated market views about fundamentals; market price can be driven by demand and supply independent of economic fundamentals even during normal times, without the influence of a bubble. For example, consider the impact on the price when a stock is added to the broad market index. The inclusion of a stock into a major market index such as the S&P 500 will be greeted with sharp increases in the stock price

due to increased demand as a result of the popularity of the index fund, and the fact that the index is at the core of many managed investment portfolios.

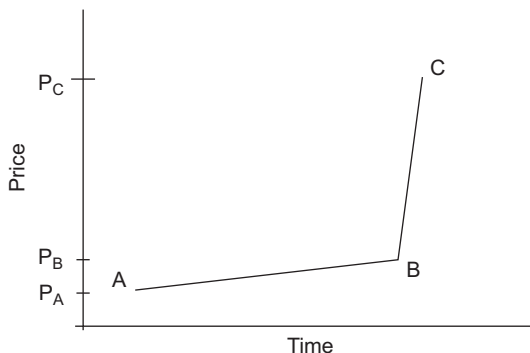
While not a perfect tool, the analysis of historical paths traveled by the market can reveal important information about the distribution of beliefs held by market participants. The beliefs of market participants can be combined with demand and supply conditions to form a forecast for future market actions. The utilization of aggregated market views to correctly interpret the true value of the market fundamentals is especially important when news moves the market away from the current equilibrium price into territories outside of the range traveled by the recent market actions. In this case the demand and supply conditions, as reflected in the past market actions, will not have a direct impact on the market dynamics going forward.

The value of the path traveled in the past in revealing rich information about the distribution of demand and supply, and market beliefs can be illustrated by the following example. Here, two different paths both move from point A to point C, but with a very different point B on the way.

Figure 9.1 shows a path with slow, gradual rises from A to B followed by rapid ascendance from B to C.

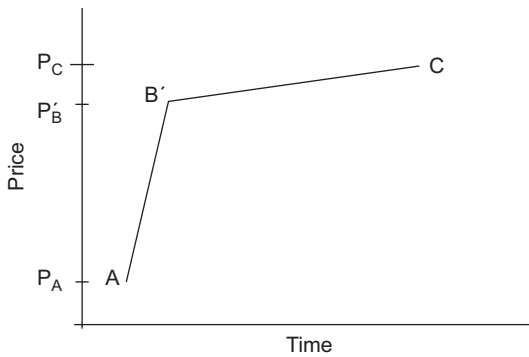
Figure 9.2 shows a path with rapid advance from point A to B' followed by slow increases from B' to C.

In the first case, the distribution of the demand and supply, and market beliefs among people who actively trade along the path is skewed towards the range between  $P_A$  and  $P'_B$ , while in the second case, the distribution of the demand and supply, and market beliefs is



**Figure 9.1** Equilibrium C with weak aggregated view





**Figure 9.2** Equilibrium C with strong aggregated view

skewed towards  $P'_B$  and  $P_C$ . The reading of distribution may be made more accurate when volume information is incorporated.

Suppose the market traveled from point A to point C after a news event without interruptions by additional news in the process, then fell back. Purely on considerations of demand and supply, in the first case, little support can be expected on the decline in the range of  $P_C$  and  $P'_B$  and more support in the range of  $P_A$  and  $P_B$ . In the second case, assuming everything else being equal, more support can be expected in the range of  $P'_B$  and  $P_C$ , and relatively weak support in the range of  $P_A$  and  $P'_B$ . In case new negative information arrives at point C and is followed with a fall in the market, the description of the demand and supply conditions will be more complicated with at least a shifting factor having to be added to the relevant price ranges. But the central point remains true that the path traveled in the past is helpful in forecasting demand and supply conditions in the future.

Out of the sample forecast of the future prices when the market moves up and away from the range traveled earlier, the demand and supply consideration would be less important; information on beliefs held by market participants about market fundamentals revealed by the path previously traveled becomes a more significant factor in inferring the new market equilibrium, when combined with newly arrived information.

Either way, arguments can be made that the path taken by the market offers important information for understanding future market movements. In the following, it is further argued that this useful information revealed by the historical path taken by the market is not fully

reflected in the current level of price; the argument is made based on an examination of the information content captured by the level of the price. For the purpose of evaluating the true state of the market fundamentals, there are two areas where the information content of the current price level is likely to differ from that reflected in the historical path of the price.

First, the relationship between current price levels and future price can be well captured by a function of the expected mean and variance of the market return in the next period under the assumption of normal distribution. But this is not a one-to-one relationship. Therefore, knowing the current market price is not enough to ascertain the exact shape of the price distribution (or the distribution of market return) for the next period. Furthermore, the distribution of market return in the next period is not necessarily normal. Therefore, the price level alone is not enough to provide all the information needed to evaluate market reaction to new information.

Second, the expected mean and variance of the market return in the next period, is calculated over the distribution of those who are expected to trade in the relevant range in the next period, weighted by the trading capital at their disposal. This distribution of demand and supply weighted by trading capital may be different from the distribution of market beliefs. The latter is appropriate for extracting aggregate market views about the true state of the market fundamentals and should be used to update each market participant's own assessment of the true state of the market fundamentals. More specifically, some people or institutions that have traded in the past may be out of the market in the next period because they are "fully invested," running against their liquidity or risk-bearing limit. The beliefs of those people and institutions will not be reflected in the market distribution used for calculating the mean and variance of expected market returns for the next period, but their interpretation of the state of the market fundamentals is useful and should be utilized along with the interpretation of other market participants to extract information about the true state of the market fundamentals.

Therefore, the level of the price does not fully capture the aggregated market beliefs about market fundamentals. But the properly aggregated market beliefs about the state of market fundamentals are required to update the view of each individual market participant. This updated belief is then used to formulate each market participant's reaction to new information in the process of reaching the next market equilibrium. For this reason, the path taken by the market in

the past provides useful information for anticipating future market movements.

To summarize, it has been argued that the historical path taken by the stock market is rich in information that can be used to effectively forecast the future. This is mainly because of two reasons. First, people's risk-bearing capacity is limited. Second, people have limited capability individually to gather and interpret all the relevant market information. It is noteworthy that the arguments presented here are not based on irrationality; people are assumed to use all the information to the best of their capability. It is important to recognize, however, that there are limits to this capability.

## NOTE

1. According to Allen and Taylor (1990). The Use of Technical Analysis in the Foreign Exchange Market. *Journal of International Money and Finance*, 11 (June): 304–314.



## CHAPTER 10

# Integrating Macro, Fundamental, Quantitative and Technical Analysis

### 10.1 THE FRAGMENTED STATE OF MARKET ANALYSIS

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The stock market valuation is a very complicated process. Being the barometer of the economy, it is buffeted by all kinds of events big and small around the world. The fact that the valuation of a stock depends on the future profit streams of the underlying asset only adds to the complication. With such complexity built into the stock market, no mortal human being can claim the intellectual capacity to know everything about the market dynamics. Similarly, a single analytical approach focusing on one specific area of the market is unlikely to produce a consistent and accurate account of all the market fluctuations. None of the three approaches, macro-economic analysis, firm fundamental analysis, or technical analysis has been successful in providing a satisfactory understanding of broad market dynamics. While market fundamentals are important, the uncertainty about the true value of stocks and limited intellectual capacity of individual market participants offer a fertile ground for human psychology and market interaction to play a prominent role in driving market movements. It is not surprising, then, that all three different approaches have been advanced to shed light on the working of the stock market from different perspectives.

Macroeconomic analysis looks at the broad environment in which firms operate. Firm fundamental analysis focuses on the regularities

between firms' financial indicators and their stock valuation. Technical analysis, on the other hand, centers on how market movements are driven by human psychology; it examines the manifestation in the asset prices of information integration through interactive market activities. While fundamental analyses are largely based on the assumption of optimization, technical analysis implicitly assumes an evolutionary process, which can be explained as a result of bounded rationality and the limited risk-bearing capacity of individual and institutional agents in the market place.

Clearly, the three approaches to market analysis look at different factors affecting the market valuation and complement each other in delineating stock market dynamics. It is surprising, then, that they have rarely been used in an integrated way in analyzing stocks. While macroeconomic analysis has been used at least as the basis for forecasting firm fundamentals, no attempt has been made to integrate macroeconomic analysis and firm fundamental analysis with technical analysis in any meaningful way. This is partly due to the stubborn refusal of academics and many fundamental analysts to accept technical analysis as a tool with sound analytical foundation. On the other hand, there have been many technical analysts who make a point in relying solely on their charts, refusing to be exposed to anything else, not even the raindrops falling outside their windows. Additionally, the integration of technical analysis with fundamental information is also made impossible by the idiosyncratic approach taken by technical analysts that so far has focused on isolated individual patterns of regularity observed sporadically in the financial market.

In fact, not much integration has been seen even between different approaches to technical analysis itself. The indicators are used mostly independent of each other. Many indicators and patterns have been analyzed, but so far not many successful efforts have been made to integrate them into a systematic understanding of stock market movements. As a result, the analysis of technical indicators and patterns is done most times independently of each other, unable to benefit from the collective wisdom generated by different approaches accumulated over close to a century. It is therefore not surprising that mixing technical analysis effectively with other forms of market analysis has been virtually impossible. This is indeed a regrettable state of affairs given the clear complementarities of the different approaches to market analysis.

## **10.2 INTEGRATING DIFFERENT TECHNICAL ANALYSES UNDER FVITA**

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One of the motivations behind FVITA presented in this book is to integrate different indicators of technical analysis into a more systematic understanding of the market dynamics. To this effect, the proposed system succeeded in decomposing market movements into three interrelated subcomponents – interval-specific volatility in the form of temporary pauses; interval-specific trend in the form of a bounded bear or bull market; and a set of well-designed time intervals intended to offer unabridged coverage of market forces of different durations. Various ways have been developed to judge whether an interval-specific trend is still in force or has been reversed. As a result, the FVITA system captures rich market dynamics in a robust way.

At the same time, the general framework of the interval chart system and the concept of a bounded bull and bear market offer a broad and open structure for understanding the interactions of different market forces. It can be readily supplemented with indicators and analyses of existing approaches in technical analysis. Different approaches and specialized knowledge about the market may be integrated with the general framework set up here to obtain a unique understanding of the market dynamics private to the individual analyst. For example, different trend indicators may be used to evaluate trend reversals. Similarly, the waves and counting of eight and R9 bars as signals of the completion of a continuous movement in a given direction may be replaced or supplemented by other continuation patterns for the timing of pauses and trend reversal points.

Furthermore, it is also hoped that with the general framework provided here, future knowledge generated about technical analysis can be developed accumulatively in offering an ever-increasing understanding of the market dynamics, rather than created independently to offer new parallel perspectives about market movements.

Among the existing approaches to technical analysis, the adaptive indicator approach in particular is worth mentioning for offering good prospects of being productively integrated with FVITA. As pointed out earlier, the adaptive indicator approach tries to overcome the market perturbation caused by volatility in confirming the change of a trend. While it does not distinguish a temporary countertrend movement from a permanent reversal of a trend, the effective signaling of the market reaching a turning point for at least a temporary countertrend

pause is a valuable contribution. The approach will be made much more effective once the problem for the uncertainty in its forecast is understood and addressed under the framework of FVITA.

Another area where an integrated approach can yield significant insight is to exploit the linkage between global markets. One notable example of such an approach is when one market experiences a straight pause-up while another market shows a clear type II pause-down. When the interval involved is large enough, say, being a monthly or higher order time interval, the type II pause-down in the second market may help to forecast the rebound in the first market as being temporary as well. Similarly, on rebound after sharp falls, the signal from one market confirming the bottoming-up can help to flag the end of the decline in the other market in case no clear signs have emerged there.

### **10.3 MACROECONOMIC ANALYSIS AND FVITA**

The broad understanding of market dynamics offered by FVITA also makes it possible to combine other analytical approaches of stock market evaluation with technical analysis. In this section, the focus will be on how FVITA can be integrated with macroeconomic analysis, before attention is turned to integrate technical analysis with firm fundamental analysis and quantitative finance in later sections of this chapter. The discussion is intended to serve as a description of the broad possibilities and the direction of the integrated approach. The purpose is to show that FVITA can serve as the main framework of an open system, into which people can plug in their own unique knowledge and insight in macroeconomic analysis to understand the market dynamics.

The greatest difficulty in applying fundamental analysis to market valuation is that most of the fundamental analysis is very difficult to quantify into a specific, robust forecast of market prices. FVITA goes some way in resolving the difficulty by dividing the impact of fundamental factors into different grids of magnitude associated with different time intervals. It is very difficult to tell precisely the percentage change in market price that can be expected from a given event. But it is much easier to tell if a fundamental event will just affect the course of a day chart, or if it is significant enough to alter the expected path of a weekly or monthly chart. Once the rough time interval of the impact is decided, the precise distance the market will travel can be left to technical analysis.



The fruitful marriage of macroeconomic analysis with technical analysis can be viewed from the other direction as well, with technical analysis as the starting point and macroeconomic analysis adding value to it. Technical analysis can be strengthened by the integration with macroeconomic analysis from two channels. First, technical analysis is based on past events for future forecasts. Therefore, it cannot forecast the impact of unexpected events or the realization of an event from the given distribution that is too different from the mean. While the impact of the new event will eventually be incorporated into the market price, the process may take some time. Without enough specialized knowledge to interpret the full impact on market valuation, most people may have to wait for the collective wisdom to gradually transpire through interactive market actions. Most times, the collective interpretation is expected to be rational; it will eventually lead to the equilibrium that does not systematically deviate from what is implied by the true magnitude of the impact. Therefore, if an analyst has a superior knowledge of macroeconomics and can see the rough magnitude of the impact right away, in terms of the interval being affected, he does not have to read it from market reactions. This will allow him to act ahead of the market for profitable trading and investment opportunities. Second, macroeconomic analysis can help the analyst to see when the market is in a bubble while FVITA will provide the tool for the best timing strategy to take advantage of the bursting of the bubble. In the following, more details will be provided on how the integrated approach can be taken in each of the two cases.

### **10.3.1 Integrated Approach to News Processing**

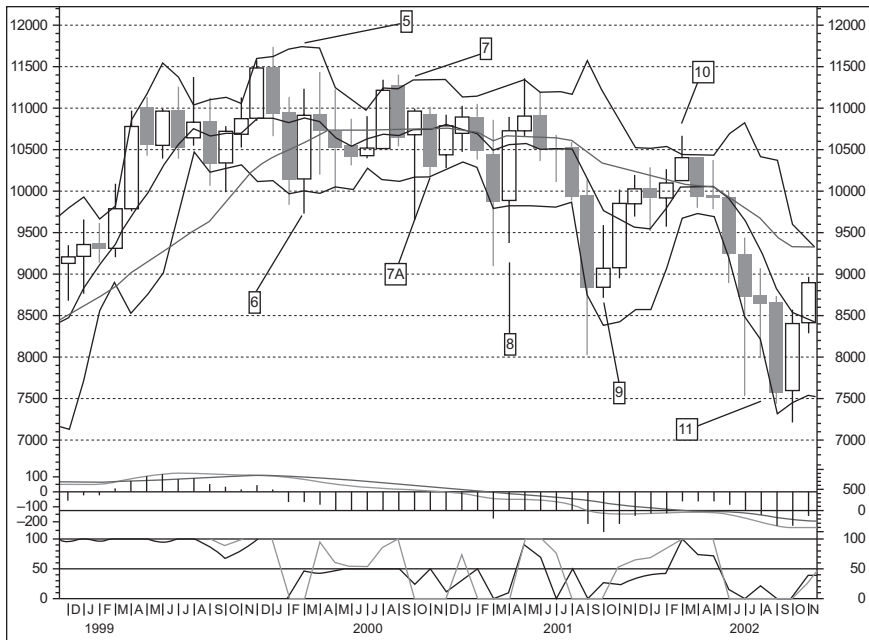
It is easy to see that macroeconomic analysis of news is complementary to technical analysis once it is understood that the market does not reach equilibrium instantaneously. Technical analysis makes its forecast of future price movements based on the observation of past market dynamics, which reflects the evaluation of the economic fundamentals by market participants, as well as expected future economic developments averaged over all possible states. This forecast will need to be modified under two scenarios. First, a market-moving event happens out of complete surprise. Second, the realization of a future economic event takes on a value that differs from the mean of the distribution used by market participants during the formation

of the historical path. The latter is what happens normally and contributes to the unexpected twists and turns in the market, but most times the deviation from the mean is not significant enough to cause changes in the expected trend in high-order time interval charts. To judge what is the time interval of the highest order being affected by a given event will require both a good understanding of FVITA and good knowledge about macro-economic analysis.

The scenario of completely unexpected events happens less frequently, but may affect intervals of relatively high orders, altering the path forecast by technical analysis in those time intervals. The 9/11 terrorist attacks were one such example. Normally, the down leg of an economic growth cycle lasts for four to six years from peak to trough, just enough to turn the yearly time interval bearish if the same concept of bounded bear/bull market is applied to charts of economic growth. The 9/11 terrorist attacks had an economy-wide implication as a result of the increased cost of doing business due to security measures being adopted, especially in terms of rising costs associated with travel and shipment of goods. On top of the bursting of the internet bubble, the impact of the event was large enough to be a recessionary force. As a result, it turned a correction in the stock market with only the half-year time interval going to the bear market into a recession-type downturn with the yearly time interval going to the bear market.

Consequently, aggressive monetary policy response was required to lift the economy and the stock market from the fall. The Federal Reserve acted to cut the targeted Federal funds rate to 1 percent. With a firm understanding of the broad implication of the 9/11 terrorist attacks on the economy, one would be able to see that the economy was going into a recession. Thus, the rebound in the immediate aftermath was not sustainable. Confident forecast could be made about the ensuing top-off (point 10 in figure 10.1), despite the charts only giving suggestive rather than affirmative signals.

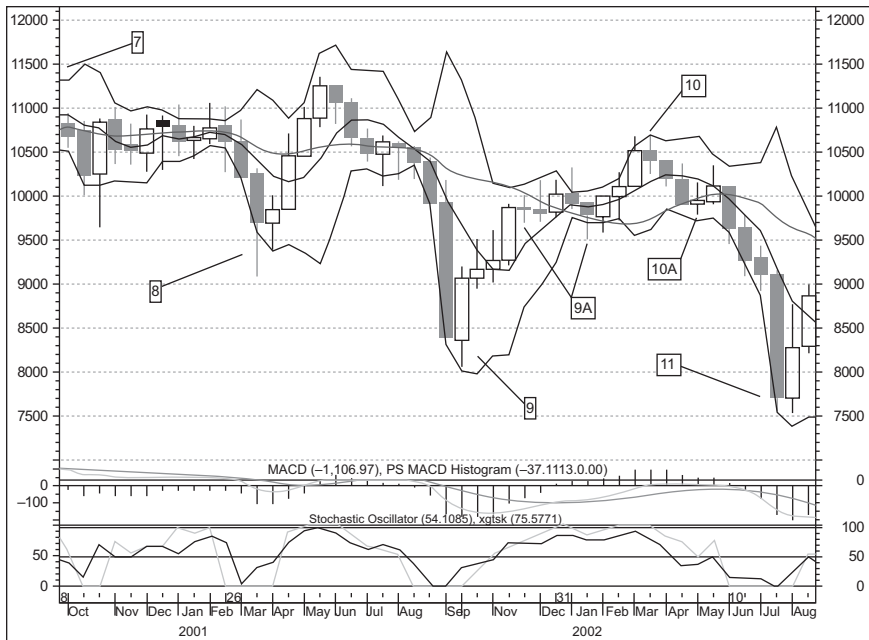
Figures 10.1 and 10.2 show that the rebound in the Dow Jones Industrial Average did not offer enough information to signal its temporary nature. There was a 2+2 pause-down at point 1 after rising for nine up-bars in figure 10.2. This was a type IIc pause-down, instead of a type II pause-down required for confirming a temporary rebound. Macroeconomic analysis was helpful in forecasting the top-off from the bear market cap reached at point 10. More detailed analysis is provided in case 2 of chapter 8.



**Figure 10.1** Monthly time interval, bear market cap forecast by macroeconomic analysis  
 Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

Figure 10.2 shows a type IIc pause-down at point 9A on the two-week interval chart.

While big-impact events such as the 9/11 terrorist attacks happen infrequently, a combination of smaller unexpected events may also create difficulty for market participants to evaluate the direction of the market with confidence. This will lead to greater reliance on market reactions, thus a longer time to reach a collective interpretation of the impact from these events. The more novel these events or the combination of the events are, and the more complicated they are related to each other, the more time it is likely to take for the market to aggregate information from different market participants through market actions. With the help of good macroeconomic analysis, one will be able to reach the right conclusion about the true impact of those events without having to wait for the market to work its way out and send out firm signals. This will create opportunities for taking a position early to benefit from the expected market actions.



**Figure 10.2** Two-week time interval chart

Source: Data used with permission from eSignal. Graphic used with permission from MetaStock

### 10.3.2 Integrated Analysis of Bubbles and Panics

Additionally, when the market falls during a recession, it is likely to take longer to observe the bottom-up signal from the stock market charts than from a reading of the economic data. The stock market is full of temporary countertrend movements, therefore, a long rising trend is required to confirm the bottom-up. The rebound needs to be large enough to turn the bear market interval into the bull market. But the economy most times is much less volatile and less likely to be subjected to false rebound. Therefore, by looking at the economic data, one will be able to confirm a stock market bottoming-up in a recession much faster than by waiting for signals of confirmation from the stock market charts.

Finally, on approaching a high-order time interval pausing point with low-order time interval rising waves incomplete, a large enough negative economic event may terminate the low-order rising wave before its completion and start the pause-down of the high-order time interval. Relying purely on technical analysis, in this case, is likely

to create great uncertainties as to whether the fall is the start of the high-order time interval pause-down or is just a premature false start. Knowing the significance of the macroeconomic event thus can lead to a more confident early forecast of the high-order pause-down.

Another way macroeconomic analysis can be employed productively with technical analysis is in taking an integrated approach to analyzing bubbles and panics. The market may rise or fall significantly on psychology without the support of really significant fundamental news. Normally, this happens as a result of great uncertainties associated with one or several novel fundamental factors that market participants have a difficult time evaluating. As a result, they have to depend on market actions more heavily to evaluate the likely impact of those factors or events on market valuation. Such a situation leaves big room for psychology to play an important role in creating bubbles or panic sell downs. In the case of a bubble, such as the internet bubble of the 1990s and the real estate bubble in the US before the 2007 crash, a good grasp of macroeconomic analysis would help to reveal that the market was not supported by fundamentals.

However, as many unfortunate fund managers can testify, making the correct judgment about the market being in a bubble can be accompanied by bad investment decisions. This will happen if the decision to go against the market trend is made with the wrong timing. The author knew professionally a very experienced fund manager who was the CEO and founder of a fund management company. The manager had been very successful before the internet bubble and made the correct judgment that the market was in a bubble in the late 1990s. But the market continued to rise while the funds managed by the company stayed away from technology stocks. The company badly underperformed the market for more than two years and the manager was forced to change his strategy under pressure from the parent company just about six months before the market started to decline in 2000. Bad loss followed, without the cushion of the previous gains; the manager left the company shortly afterward.

A good understanding of technical analysis would have gone a long way to help the fund manager in deciding on the right timing of going against the market when he correctly saw that the market was in a bubble. On the one hand, he would have been able to take advantage of the bubble against his fundamental analysis in the early stage of the rise. On the other hand, he would have resisted at all cost the pressure to push him into the technology stocks at the last stage of the rise.

The conditions leading to a bubble—large uncertainties about market valuation from the perspective of market participants—suggest that

once a bubble is in force, the psychological factor is likely to become more and more dominant as more and more uninformed people get in. Thus the market has to run its course under the control of psychology before fundamentals re-exert their influence. The course of the market largely under the control of psychology is best analyzed with technical analysis. Most times, the market is likely to rise towards the completion of the second to last bar in the rising wave before possible hesitation may develop against a further upside. Therefore, risk-reward trade-off entails taking long positions before the point of possible hesitation.

On the other hand, once that point of possible hesitation is reached, no long position should be taken. One should only retake long positions after the market has reached the expected pausing point and completed the expected downward pauses. On large declines expected at high-order pausing-down points, the focus should be on detecting signals for the start of the high-order pausing-down and taking short positions for the decline. Needless to say, such a shorting strategy can be highly rewarding at the bursting of a bubble. However, shorting a running bubble can result in big losses if done with the wrong timing. To get the timing right, macroeconomic analysis is not very helpful; technical analysis must be employed, and carried out correctly.

While positive news with novelty and great uncertainty can lead to bubbles, negative news with novelty and large uncertainty, especially coming in groups and with the negative factors related to each other in a complicated way, can lead to panic sell-downs. The decline can be exacerbated if the news comes right at or close to a high-order downward pausing point. This was the case of the Black Monday crash on October 19, 1987. Before the crash, long-term interest rates of US treasury bonds increased to 10.5 percent. The trade deficit was rising and the last release surprised the market with a larger than expected increase. With the dollar already weakening, many market participants were worried about the difficult prospect of either further weaknesses in the dollar or a further increase in interest rates if the dollar was to be supported in face of the rising trade deficit. In fact, a further increase in the interest rates may have been inevitable, as further weaknesses in the dollar would have led to an increase in inflation, prompting a rise in the interest rates. The macroeconomic outlook appeared to be clouded. But this was just one reading of the situation.

Before and after the crash, most economists believed that there was no real economic reason for the steep market decline. It became clear later that a high-trade deficit could live with a strong dollar for a considerable period of time. Despite the fact that there were talks about the market being overvalued and that "there was a great deal of investor

talk and anxiety around October 19,"<sup>1</sup> most people were caught by surprise by the severity of the downturn.

In fact, the economy was not visibly affected in the aftermath of the sharp fall, suggesting the crash was very much a false alarm as far as the fundamental economic outlook was concerned. It was the novelty of a weakening dollar with the complication of rising interest rates that increased the uncertainty about the economic outlook; increased uncertainty in turn left big room for the psychological factor to play a dominating role much the same way as in a bubble, only towards a different market direction. Periodic downward adjustments of market valuation without an accompanying real revision of the fundamental economic outlook are nothing new. As Nobel Laureate Paul Samuelson famously observed, "the stock market has forecast nine of the last five recessions." Pure market-driven declines without fundamental justification are consistent with the expectation in FVITA of regular downward pauses on a rising trend. What was unusual in 1987 was that a regular pause-down was accompanied by large macroeconomic uncertainties in the eyes of many market participants, and the uncertainty increased the severity of the downturn.

It is surprising that even with 20/20 hindsight, the debate continues on whether there were rational economic reasons for the crash, despite the fact that the economy continued healthy growth before and after Black Monday. The continued debate highlights uncertainties in analyzing the somewhat complicated economic outlook back then, corroborating the point that the large uncertainty contributed to the severity of the downturn. The continued debate also demonstrates the deficiency of trying to explain market movements purely from the perspective of economic fundamentals.

An important thing to keep in mind is that without a fundamental economic reason to justify the fall, as steep as it was, it was unlikely to last for long. As pointed out earlier, a real economic downturn will turn the yearly interval into the bear market. Otherwise, the fall in the stock market will most likely be a temporary pause-down associated with the turning point of a relatively short time interval. At most, the pause-down will turn the half yearly interval into the bear market, or result in the quarterly interval to fall to the balanced market. The latter is equivalent to a half yearly interval reaching stochastics-B. The exact duration of the pause-down can be analyzed by looking at the time interval of the highest order where a pause-down point is reached.

The fall in 1987 came after a three-legged rise in the quarterly interval starting from the second half of 1982. The rise lasted for 11 bars, roughly R9 up-bars, in the half yearly interval. Without a higher

order interval pausing point in the immediate future, a type I pause-down was expected for two bars in the half yearly interval, or eight bars in the monthly interval. The market eventually fell to quarterly stochastics-B, or virtual eight bars in the monthly interval before bottoming-up.

A good understanding of both technical analysis and macroeconomic analysis is required if one hopes to act with a clear vision of market dynamics in a case such as the 1987 crash. A good knowledge of technical analysis was required for one to see the coming pause-down before the decline, while awareness of the possible dilemma caused by a weakening dollar and rising interest rates should prompt one to the possible severity of the fall. On the other hand, after the sharp fall, a firm understanding of macroeconomic analysis would help one to see no significant economic risk for a cyclical downturn. A forecast of a temporary technical pausing-down of a relatively low order could be made despite the severity of the fall. A rough estimate of the depth and duration of the fall could then be obtained after the inspection of the quarterly and half yearly chart patterns. Thus, an integrated approach employing both macroeconomic analysis and FVITA would have been very useful in understanding the fall and anticipating the rebound.

Macroeconomic analysis can be a useful complement to technical analysis both when fundamental economic events are the driving force of market dynamics and when they are not. A dog that does not bark can reveal as much information as one that does. Therefore, technical analysis should not be conducted in the absence of analysis of economic fundamentals even when the market is mainly driven by psychological factors. On the other hand, economic analysis cannot be used alone as an effective way to understand market dynamics, as bubbles and panics, large and small, periodically grip the market. Technical analysis and the analysis of economic fundamentals have to be applied in an integrated way in order to reach a broad and robust understanding of market dynamics.

## **10.4 FIRM FUNDAMENTALS AND FVITA**

Firm fundamental analysis can be integrated with FVITA to analyze single stock dynamics in similar ways as macroeconomics is integrated with FVITA to analyze broad market indices. Firm fundamental analysis, when combined with the interval grid set up in FVITA, can be used to promptly forecast a new equilibrium market price after a market-moving event. It can help to make the forecast ahead of technical



signals. This is especially useful when technical analysis sends out ambiguous signals or when most of the profitable opportunities may have evaporated when a clear signal can be observed either with a type II or III pause or after a bull/bear market switch to confirm the change of trend. Alternatively, firm fundamental analysis can also be used to signal bubbles or panics when the stock price deviates from the stock's true valuation, complementing technical analysis in determining the exact timing of the price reversal back towards the true valuation.

There are three additional ways to integrate fundamental analysis with technical analysis that are unique to single stock valuation. First, the overall uptrend of the asset value can be reversed in the case of the company going towards bankruptcy. In this case, a good understanding of the firm's fundamentals may help to decide whether a bottom-up can be expected when the bull floor is reached. On the other hand, in cases where the bull floor is broken and the overall price trend has turned bearish, the company can be judged as heading towards bankruptcy unless radical restructuring or a takeover takes place; technical analysis thus can help to avoid the mistake of taking long positions on a short-term temporary rebound. This is especially helpful when there appears to be improvements in fundamentals due to chance events or superficial attempts at reviving the firm. Second, on the way down, type II and III pause-ups become meaningful signals for a temporary pause-down as opposed to the case of analyzing the broad market index where declines from a historical high are always temporary. Third, restructuring may occur that fundamentally changes the firm's valuation and outlook, with the possibility of eliminating all the relevance of the historical path in forecasting the future dynamics of the stock price. A successful restructure, for example, can invalidate a confirmed overall falling trend towards bankruptcy. In this case, firm fundamental analysis will help the analyst to avoid the mistake of using irrelevant past history in technical charts to make false forecasts of the future stock price.

## **10.5 OPTIONS AND FVITA**

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The key features about options are that their valuations are heavily influenced by historical volatility and that the implied volatility does not always accurately reflect the asymmetric risk that can often be forecast with a high degree of confidence by using FVITA. This leads to mispricing and offers frequent trading and investment opportunities.

The majority of quantitative analysts use little if any macroeconomic analysis, firm fundamental analysis or technical analysis. As a result, the pricing of derivatives provides good opportunities for using FVITA for arbitraging at forecast turning points or when a trend can be confirmed. Even market-traded options often have implied volatilities not consistent with what can be predicted by technical analysis at turning points or when a trend reversal can be confirmed. The following are some examples of the opportunities when the market is expected to move up. Similar examples can be constructed with the market expected to move down.

1. Selling puts that expire shortly before the expected duration of a pause-up and buying calls of the same duration. This strategy can be employed to exploit the mispricing at the following pausing-up points:
  - i. After eight down-bars with the MACD histogram remaining positive. At least a two-bar pausing-up is expected.
  - ii. After completion of a wave to reach a support level, with a type II pause-up already observed on the way down. Another type II pause-up is expected.
  - iii. After more than halfway finished on a pause-down, reaching interval  $t$  stochastics-A, the completion of a wave and  $t+1$  Bollinger lower band  $+2$ . A type II pause-up in interval  $t$  is expected.
  - iv. After completing R9 down-bars with MACD divergence. A type I pause-up of two bars is expected.
2. Selling puts and buying calls on bottoming-up:
  - i. After the bottoming-up is confirmed when the bear market interval  $t$  turns to the bull market.
  - ii. When the bull floor is reached after type II pause-ups on the way down.

Even when there is no firm signal about which direction the market is likely to take, bull floors and bear caps are points with increased volatility and often offer good arbitrage opportunities. In the case of a bull floor being reached, for example, it will either break through to confirm a reversal of the uptrend for further decline, or rebound to bottom-up for a new high. In the former case, lasting moves are expected towards the down side on course to finish the next wave or the running high-order thrust; in the latter case, lasting moves are expected towards the up side. Therefore, buying straddle or strangle offers

a good arbitraging strategy, especially in cases where the strategy is cheap when the floor is being reached with little volatility on the way. If one has good information, either from fundamental analysis or technical analysis, about which direction the market is more likely to take, stripes and straps may be employed to capitalize on this information for higher expected profit.

## NOTE

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1. Shiller 1987. Investor Behavior in the October 1987 Stock Market Crash: Survey Evidence. NBER Working Paper. Shleifer, A., and R. Vishny. 1997. The Limits of Arbitrage. *Journal of Finance* 52 (March): 35–55.



### **11.1 STATISTICAL ANALYSIS**

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Financial economics research done on university campuses and fundamental analyses conducted in the financial industry have little in common with technical analysis in their respective methodologies. But one technique of research, statistical analysis, has been employed by all three approaches. Investment strategies based on fundamental macro and firm research use statistics to find regularities connecting economic and financial variables with stock prices; technical analysis employs statistics to discover repeated patterns relating past market actions to future market prices; similarly academic financial economics research, attempts to examine the theoretical validity of an activist approach by analyzing the statistical significance and robustness of forecastable patterns in the financial market.

Given the accumulating econometrical work pointing towards the existence of forecastable patterns in market price dynamics, statistics may appear to be one starting point for the integration of different approaches to market analysis. The FVITA presented in this book, however, raises doubts on such a prospect, at least when considered under the existing methods being used in each of the three different research undertakings.

In fact, whether statistics is effectively used in any of the three different approaches to financial market analysis is put into serious question. This is because of two important features of the market dynamics highlighted by FVITA. First, trends are dotted with temporary countertrend pauses. Second, low-order patterns are dominated by higher order patterns. As a result, the statistical relationship describing patterns in financial markets may be nonlinear and estimated

parameters time-varying; and the time-varying parameters are likely to take on different signs under different high-order conditions. It is not known for sure what is the longest time interval to which FVITA applies. But for the majority of the econometrical analysis carried out so far, it is safe to say that the data are subjected to influence from higher order intervals.

In this regard, it is telling to note that the dependence on history in price appears to be more robust for data collected from long time intervals of 5-10 years than for data from shorter time intervals, say the weekly or monthly intervals. This would be consistent with the scenario where the market memory weakens considerably beyond the 10-year interval to reach 20- or 40-year intervals, so that the relationship described by data from the 10-year interval is not subjected to the interference of higher order influences and is thus more stable. It may also be explained by the fact that the data available are not long enough to reach market turning points in 20-year or longer intervals. Thus, even if market memory is long enough to make the 20-year interval matter, it is not reflected in the data yet due to the short recorded history. As a result, the relationship described by data from the 10-year interval is stable and the parameters not affected by different forces from the 20-year or longer intervals. Similarly, the fact that there has not been even a full type I pause-down for two bars in the 10-year interval may help to explain the stability in the statistical relationship derived from the 5-year interval data.

For shorter term intervals, however, the results of historical price dependency in the majority of the statistical analyses may be spurious. Furthermore, the statistically significant results invariably come with low explanatory power. The low explanatory power may well be a result of a more frequently appearing relationship being weakened, but not completely offset, by another less frequently appearing relationship. This can happen, for example, in a case of a time-varying parameter with two possible values associated with two different states in higher order intervals. The dominance of one relationship over the other relationship may happen as a result of the stock market having an overall positive trend. As a result, the relationship associated with the rising trends may dominate the relationship associated with the falling trends, to produce a statistically significant, but false characterization of the true relationship.

Therefore, such statistical analysis suffers the problem of missing variables associated with higher order conditions, which may completely change the studied statistical relationship under different states.

As a result, there is a high risk that the obtained statistical relationship may fail when used out of sample. Furthermore, if it fails, it may fail for a considerable period of time as the state of the high-order time interval will not be changed quickly when measured in terms of the low-order interval observation points.

The exact nature of the statistical failure described above is based on the analyses of FVITA, but the basic issue raised is more general and should be a concern as long as one accepts the general notion that the historical path taken by the market can affect future prices. Once this general notion is accepted, there are no rational arguments for such a connection between history and future to be limited to any specific time intervals in any specific direction. The changing influence from high-order intervals naturally leads to possible non-linear statistical relationships and time-varying parameters with different signs. For this reason, statistical analysis is likely to be biased towards not rejecting the random walk theory. When it does reject the random walk theory, the fit of the alternative specification is unlikely to be good and the profit margin from investment strategies based on such a fitted relationship is likely to be thin, even when tested in-sample. Because the alternative specification of market dynamics is likely to be false, or at least not accurate due to wrong or biased parameter values, the risk of taking the wrong position is high when such a strategy is used out of sample.

Given the above concern, as a minimum, statistical analysis should avoid using data series of relatively short history. With data that has a long history, subgroup consistency of the specified relationship must be examined. The data should be divided into several subgroups to check whether the statistical relationship can be consistently estimated over each sub-period with significant and stable parameter values.

## **11.2 TECHNICAL ANALYSIS AS PUBLIC KNOWLEDGE**

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It has been reasoned that technical rules cannot survive public exposure. Market dynamics will be affected as more and more people know about a particular technical trading rule; front running may occur, making the rule ineffective one way or the other. This reasoning appeared to have worked out well in the case of the January effect. As arbitrageurs stepped in at the end of the year to take advantage of the expected higher return in January, the observed higher return at the beginning of the year had disappeared.

In the case of rules based on constructed technical indicators from historical data, the prognosis is more complicated. If the rule does not work perfectly before being publicized, the publicity may result in the rules becoming ineffective. Take the MACD indicators as a hypothetical example. The MACD fast line crossing the signal line from below has been used as an indicator of a positive trend for further upside. Suppose it had worked 70 percent of the time before becoming public knowledge. After it became public knowledge and was believed to be effective, people would now raise the probability of further upside after the crossing from 70 percent to 100 percent. This would result in higher buying interest before the crossing and lower selling interest, thus leading to more occurrences of crossing than before. As the long-term trend was not expected to be affected by the local behavior of market participants following the revelation of the trading rule, increased crossing would lead to a fall in the success rate and a rise in the failure rate of the trading rule. As a result, the rule might become completely ineffective; people would start to question the effectiveness of the rule; equilibrium would eventually be reached where losses and profit from using the rule would exactly balance out.

However, the story told above is not all that is possible after a trading rule becomes public knowledge. There are two cases under which technical rules can survive the transition from private information to public knowledge. First, in the case discussed above with balanced profit-loss expectations for a publicized indicator, one can still use the indicator for profit if another indicator can be developed to increase the forecasting accuracy when the two indicators are used jointly. The profit will persist as long as the second indicator or the way to use the two indicators jointly remains private information. Second, if the original indicator being used is robust with a success rate of close to 100 percent, then the publication of such a rule will not reduce its effectiveness because market behavior around the point where the rule may be applied will not be changed. For easy comparison, use MACD crossing again as a hypothetical example to illustrate the point. Suppose the rule had been 100 percent effective, and correctly anticipated by the market participants at around the crossing point. In this case, the publication of the rule would not change the market expectation before the crossing of the trend after the crossing being made; therefore the market behavior before the crossing would not change. As a result, the publication of such a rule would not change the success rate of using the rule. It would remain 100 percent effective. The only change that may occur is the speed of market reaction once the crossing is made, as the publication of the rule may reduce the time required to process the information affirming the establishment of a positive trend.



For reasons discussed in the above two cases, FVITA is likely to remain effective in the public domain. First, the rules used to judge trend reversal and temporary pause-ups are highly robust. Therefore, the publication of the rules is not likely to fundamentally affect market behavior before the signal is confirmed. As a result, the publication of the rules is not likely to change their effectiveness, although it may reduce the window of opportunity for acting on the signals. Second, the general framework of FVITA is flexible enough to be combined with other types of technical analysis as well as fundamental macroeconomic and firm analysis. The skill level and specific approach taken as well as how the information is integrated with FVITA are all private knowledge to each individual. Therefore, the resulting strategies to be taken are less prone to the pressure of front running from other market participants.

For a more general perspective on the issue, note that knowledge on technical analysis is no different from knowledge on any other subject matter. Take playing chess, for example. There are many different chess books available in bookstores for anyone who is interested in reading them. Everybody can benefit and become a better player by reading a few good chess books. Knowledge and wisdom acquired from these books are unlikely to become useless just because everybody has access to them. It is probably safe to say that on the way to their success, all chess champions read and benefited from a few good chess books. The accumulated knowledge about the game and the well-studied strategies are very helpful for designing new strategies according to different games being played. But not all people will benefit from the knowledge to the same degree. People with talent and people who study the books diligently and use knowledge creatively will be able to gain an edge over others in playing a better game.

Using another example, teaching competitive strategies in business schools and publishing books on competitive strategies can help many people become better managers. However, they do not eliminate all the profitable opportunities from better-managed businesses. The publicized knowledge only offers more effective tools for analyzing the industry and designing competitive strategies. Managers have to engage the tools with talent, creativity, hard work, and knowledge about the industry in order to use the tools most productively in designing winning strategies for higher profitability. Thus, making the knowledge publicly available does not eliminate profitable opportunities for applying the knowledge. This is despite the strong zero profit postulation that characterizes all competitive industries as a broad approximating condition.

Obviously, the above argument makes more sense when applied to an elaborate analytical system than to a single rule or indicator. This is especially so when the analytical system is further integrated with other sophisticated bodies of knowledge.

The same logic applies equally well to financial market analysis, including technical analysis in general and FVITA in particular. The most important content of the analytical system presented in this book is a systematic way to think about forces behind the observed market dynamics. There are quite robust rules presented in the book that can be used to forecast market movements, capture the fleeting profitable opportunities, and reduce unnecessary mistakes. However, more importantly, the main framework and broad understanding about market dynamics presented here provide a platform where talent, creativity, hard work and different knowledge about the financial market can be brought together. While the insight provided by FVITA will benefit every reader, its openness for integration with other approaches to analyzing the market will allow the most innovative and sophisticated users to obtain a competitive advantage. The effectiveness of the system is likely to be preserved as a result of the ample space for personalized approaches and individualized capability in exploiting the potential for its application.

## CHAPTER 12

### Concluding Remarks

This book sets out to take advantage of the complementary power of the accumulated knowledge in technical analysis and address the main weaknesses in the existing approaches—not being able to adapt the analytical tools to ever-changing market conditions. This task has been accomplished by departing from the focus on independent fixed time-frame charts by most technical analysis while taking a step further along the path taken by two lines of innovative research: the adaptive indicator approach and the three-screen system. The analysis here adapts to different market conditions by focusing on the appropriate time intervals, while employing traditional indicators in creative ways for the analysis of each interval under consideration and clearly spelling out switching conditions from one interval to the next.

The critical innovations of FVITA are three: first, FVITA recognizes that market dynamics are driven by trending forces associated with different time intervals and that the trend in each time interval is effective only over a limited range; second, by integrating the analysis of different indicators, FVITA establishes clear and robust rules to determine whether a trend has been reversed and when a countertrend can be judged to be only temporary; and third, FVITA offers a broad understanding of the market dynamics rather than a catalogue of isolated market regularities reflected in the observed patterns.

As a result, FVITA contributes to technical analysis in a number of important ways. First, it demonstrates that ignoring the influence of high-order intervals creates high uncertainties in technical analysis. The problem is successfully addressed by the introduction of a well-designed system of interval charts that offer unabridged coverage of dynamic forces in the market. Second, it clarifies the concept of a trend and points out the limited range of effectiveness of a trend

by adopting the concept of bounded bull and bear markets. In doing so, FVITA succeeded, for the first time in technical analysis, in providing highly robust rules to judge when a trend is being established and when it is reversed. Third, by establishing a complete set of well-constructed time intervals and offering a systematic way to understand broad market dynamics, FVITA offers a unifying framework, for the first time, to facilitate the potential integration of different approaches to technical analysis. In fact, the benefit goes beyond pure technical analysis. The set of well-placed time intervals and the broad understanding of market dynamics also makes it possible to integrate technical analysis with macroeconomic and firm fundamental analyses.

Mindful of the still strong influence of the efficient market hypothesis and the skepticism against technical analysis, a summary has been provided of the existing theoretical and empirical evidence in support of active market timing. To address the problem of not having a theoretical justification faced by technical analysis, analytical arguments are presented to show the important information content of past market actions based on the specialized and limited knowledge base of individual market participants, in addition to their limited financial resources and risk-bearing capacity to fully take advantage of arbitrage opportunities.

Any analytical approach to financial market forecasting, be it fundamental or technical analysis, will have to confront the prospect of losing its effectiveness after becoming public knowledge. By offering mostly robust signals, FVITA will not significantly alter the market behavior before the signals are confirmed, and therefore should have a good chance of surviving the damning prospect. At the same time, by allowing the integration of other technical analysis and fundamental analysis with its own analytical framework, FVITA can be made part of an analytical system that is private to an individual user, thus remaining a valuable tool while in the public domain; users of FVITA will be able to differentiate themselves through exploiting individual talent, creativity and special knowledge about the financial market to achieve higher investment returns and increased profitability.

While many rules have been provided here in order to offer maximum coverage of the market dynamics, more needs to be done in order to allow actions to be taken as quickly as possible. In particular, the signals required to confirm a trend reversal often take considerable time to be completed. As pointed out in the book, the wait is necessary in general in order to obtain highly robust results. However, fruitful efforts may be made in future research to differentiate various market conditions and produce early signals accordingly for specific circumstances.

## Glossary

**1+1 pause-down** Two falling bars separated by a rising bar with the second falling bar not reaching below the low of the first falling bar.

**1+1 pause-up** Two rising bars separated by a falling bar with the second rising bar not reaching above the high of the first rising bar.

**2-of-3 rule I—temporary pauses** Conditions for timing temporary pauses.

**2-of-3 rule II—trend reversal** Conditions for timing a trend reversal.

### A

**Aborted falling wave rule I** Conditions and implications of incomplete waves.

**Aborted falling wave rule II** Conditions and implications of incomplete waves.

**Aborted rising wave rule I** Conditions and implications of incomplete waves.

**Aborted rising wave rule II** Conditions and implications of incomplete waves.

**Aborted waves rule** Conditions and implications of incomplete waves.

### B

**Bear market** A given interval on a falling trend.

**Bear market cap** The maximum upside on a pause-up with the overall downside incomplete.

**Bear market cap rule I** Specification of the range of rebound in a bear market.

**Bear market cap rule II** Specification of the range of rebound in a bear market.

**Bear market signals rule** Signals confirming a bear market.

**Bollinger lower band** Two standard deviations below the five-period moving average line.

**Bollinger lower band as bottoming-up point rule** Conditions under which a Bollinger lower band serves as the bottom-up point.

**Bollinger lower band as pausing point rule** Conditions under which a Bollinger lower band serves as a pausing point.

**Bollinger lower band+2** Bollinger lower band with MA-14 below market price and MACD histogram in the positive.

**Bollinger upper band** Two standard deviations above the five-period moving average line.

**Bollinger upper band as a pausing point rule** Conditions under which a Bollinger upper band serves as the bottom-up point.

**Bollinger upper band as topping-off point rule** Conditions under which a Bollinger upper band serves as a pausing point.

**Bollinger upper band+2** Bollinger upper band with MA-14 above market price and MACD histogram in the negative.

**Bottom-up rebound+type II pausing-down rule** The implication of a bottom-up rebound followed by a type II pausing-down.

**Bottoming-out on a pause-down rule** Signals that confirm the bottoming-out from a decline.

**Bottom-up** A trend reversal towards the upside.

**Bull market** A given interval on a rising trend.

**Bull market floor** The maximum downside on a pause-down with the overall upside incomplete.

**Bull market floor rule I** Specification of the range of pause-downs in a bull market.

**Bull market floor rule II** Specification of the range of pause-downs in a bull market.

## C

**Cap after type III pause-down rule** Describing the topping-off point after a type III pause-down on a temporary up trend.

## F

**Falling by four bars to the Bollinger lower band+2 rule** Specification of a market turning point.

**Floor after a type III pausing-up rule** Describing the bottoming-out point after a type III pause-up on a temporary falling trend.

**FBVITA** Full View Integrated Technical Analysis, the analytical system presented in this book.

## G

**Ghost stochastics** Stochastics defined by the highest high on rising and lowest low on falling instead of the closing price.

**Ghost-A** Ghost stochastics at 0.

**Ghost-B** Ghost stochastics at 100.

## H

**Halfway rule** Caution required when positions are taken on temporary pauses.

**Hidden two bars down** Two falling bars that are not visible from the chart, but can be constructed from lower order interval bars or by realigning the opening and closing time of the bars in the considered interval chart.

**Hidden two bars up** Two rising bars that are not visible from the chart, but can be constructed from lower order interval bars or by realigning the opening and closing time of the bars in the considered interval chart.

## I

**Implication of type IIc pause-ups rule** What to expect after type IIc pause-ups.

**Implication of type II pause-ups rule** What to expect after type II pause-ups.

**Implication of type II pause-downs rule** What to expect after type II pause-downs.

**Implication of type IIc pause-downs rule** What to expect after type IIc pause-downs.

## M

**MA-14** Fourteen-period moving average.

**MACD** Moving average convergence divergence.

**MACD divergence** The MACD basic line reaching a new high while the price line does not; or the MACD basic line reaches a new low while the price line does not.

**MACD histogram** The difference between the MACD basic line and the signal line.

**MACD signal line** A nine-period moving average of the MACD basic line.

**MACD+Bollinger lower band+2 rule** Specification of a market turning point.

**MACD+Bollinger upper band+2 rule** Specification of a market turning point.

## P

**Pause-down** A temporary downward movement against a rising trend.

**Pausing-downs from a historical high rule** Temporary pause-downs after reaching a historical high.

**Pause-downs on a temporary uptrend rule** Countermovements on a temporary uptrend.

**Pause-up** A temporary upward movement against a falling trend.

**Pause-ups on a temporary downtrend** Countermovements on a temporary downtrend.

## Q

**Quasi-eight bars down** Falling for seven bars to reach a support level.

**Quasi-eight bars up** Rising for seven bars to reach a resistance level.

## R

**Resistance** A local low or high reached in the past with at least two bars on each side, being reached by the market while rising.

**Rising by four bars to Bollinger upper band+2 rule** Specification of a market turning point.

## S

**Signals of a pausing-down rule** Confirming a downward movement as temporary.

**Signals of a pausing-up rule** Confirming an upward movement as temporary.

**Six-bars rule in temporary pausing-downs rule** Specification of the downside on temporary pause-downs.

**Six-bars rule in temporary pausing-ups rule** Specification of the upside on temporary pause-ups.

**Stochastics-A** Stochastics at 0.

**Stochastics-B** Stochastics at 100.

**Support** A local low or high reached in the past with at least two bars on each side, being reached by the market on decline.

## T

**Thrust** Any of a number of continuation patterns.

**Top-off** A trend reversal towards the downside.

**Topping-off on a pause-up rule** Conditions for the end of a pause-up.

**Trend reversal** The termination of a running trend and the start of a new trend in the opposite direction.

**Turning down after rising for eight+ points rule** Specification of a market turning point.

**Turning down after rising for R9 bars rule** Specification of a market turning point.

**Turning up after falling for eight+ points rule** Specification of a market turning point.

**Turning up after falling for R9 bars rule** Specification of a market turning point.

**Type I cap and floor after market reversal rule** Specification of a trend reversal point.

**Type I pause-down** A one-bar pause-down after rising for four to seven bars.

**Type I pause-up** A one-bar pause-up after falling for four to seven bars.

**Type II pause-down** A two-bar pause-down after rising for four to seven bars.

**Type II pause-up** A two-bar pause-up after falling for four to seven bars.

**Type IIc pause-down** A 1+1 pause-down after rising for four to seven bars.

**Type IIc pause-up** A 1+1 pause-up after falling for four to seven bars.

**Type III pause-down** A three-bar pause-down after rising for four to seven bars.

**Type III pause-up** A three-bar pause-up after falling for four to seven bars.

## V

**Virtual eight bars down** When used to refer to interval  $t$ , the term means interval  $t+1$  reaches stochastics-A, which can be regarded as equivalent to the market falling for eight bars in interval  $t$ .

**Virtual eight bars up** When used to refer to interval  $t$ , the term means interval  $t+1$  reaches stochastics-B, which can be regarded as equivalent to the market rising for eight bars in interval  $t$ .

## W

**Waves** Continuation patterns separated by two-bar pauses towards the opposite direction.



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