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Moving Averages and Rates of Change: Tracking Trend and Momentum

In the last chapter, you learned a method of constructing and maintaining moving averages. The method described there applies to the construction of what is called a simple moving average, a moving average that gives equal weight to all the data points included in that average. Other forms of moving averages assign greater weight to more recent data points so that the average is more influenced by recent data. This chapter provides additional information regarding the construction and application of moving averages.

The Purpose of Moving Averages

Moving averages are used to smooth out the “noise” of shorter-term price fluctuations so as to more readily be able to identify and define significant underlying trends.

For example, Chart 3.1 shows the Nasdaq 100 Index along with three simple moving averages, a ten-day moving average that reflects short-term trends in the market, a 50-day (if plotted weekly, a 10-week) moving average that reflects intermediate market trends, and a 200-day (or 40-week) average that reflects major trends in the stock market. (Moving averages can employ monthly entries for very major term trends or, conversely, can be plotted even at one-minute intervals for very short-term, intra-day, day-trading purposes.)

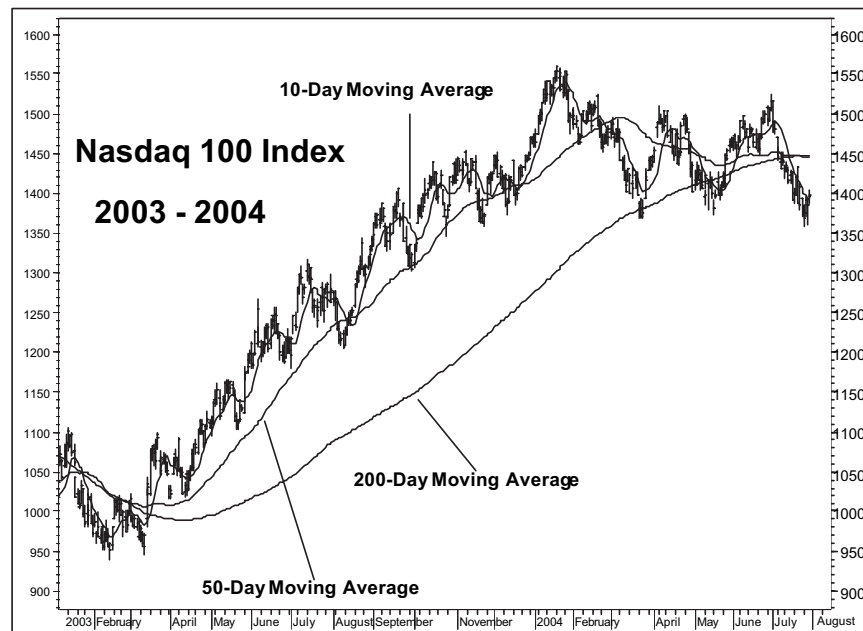


Chart 3.1 The Nasdaq 100 Index with Moving Averages Reflecting Its Long-, Intermediate-, and Short-Term Trends

Chart 3.1 shows the Nasdaq 100 Index with three moving averages, reflecting different time frames. The 200-day moving average reflects a longer-term trend in the stock market—in this case, clearly up. The 50-day or approximately 10-week moving average reflects intermediate-term trends in the stock market during this period, also clearly up. The ten-day moving average reflects short-term trends in the stock market that, on this chart, show a bullish bias in their patterns but are not consistently rising.

Chart 3.1 starts as the 2000–2002 bear market was moving toward completion, reaching its bear market lows and completing its transition into the emerging bull market that developed during 2003. The ten-day moving average was penetrated by daily price movement in mid-March that year, turning sharply upward. You can see how turns in the ten-day average took place, reflecting changing trends in daily price movement.

Let's review this ten-day moving average more carefully. The slopes of moving average thrusts indicate the underlying strength of market trends. Examine the upturn in the ten-day moving average that took place in mid-February 2003 and continued into March. The slope and length of this upturn were moderate, as was the subsequent downturn into mid-March.

Now look at the upturn in the ten-day moving average that took place starting in mid-March: This had very different characteristics. The slope of the March advance was much more vertical, indicating greater initial momentum, a sign of increasing market strength. The length of the initial upthrust lengthened, another positive indication. The subsequent retracement into April took place at a lesser slope. The advancing leg had more vitality than the declining leg, which was of lesser duration.

Let's consider now the moving average pulses that developed in mid-April, late May, and early July. The April to late May advancing pulse was relatively long in its consistent advance, which developed at a strongly rising angle. The May to June pulse was shorter (signifying lessening upside momentum or strength). The June to July pulse showed further reductions in its length and steepness of thrust, reflecting still diminishing upside momentum.

As a rule, a series of diminishing upside pulses during a market advance suggests that a market correction lies ahead. A series of increasing upside pulses suggests that further advances are likely.

You might want to review the series of pulses between August and November for further examples of these concepts. You might also want to notice the series of higher highs and higher lows in the ten-day moving average, clearly signifying an uptrend in motion.

The Intermediate-Term Moving Average

The ten-day moving average during the period in Chart 3.1 was clearly tracing out patterns that, between March and October, signified a strong market climate. However, market indications produced by moving average patterns became somewhat more ambiguous as October moved into early December. Upside pulses weakened, and a more neutral pattern developed.

Although short-term patterns were becoming more neutral, intermediate trends remained strongly uptrended, as you can see from the 50-day moving average, which based during March and April, turned upward thereafter, and rose steadily through the end of the year.

When intermediate trends are strong, the strategy of choice is usually to buy when prices fall to or below the shorter-term moving averages. Such patterns frequently provide fine entry points within favorable, strongly rising stock market cycles. The rules are reversed during more bearish periods. When intermediate-term market trends are clearly in decline, selling opportunities frequently develop when daily stock prices or market indices approach or penetrate shorter-term moving averages from below.

The Long-Term 200-Day Moving Average

The 200-day moving average reflects longer-term market trends. As you can see, it naturally responds more slowly than the 50-day moving average to changes in the direction of market movements. The 200-day average turned upward in April 2003 and continued upward throughout the year, with the slope of its advance accelerating and reflecting ongoing market strength. Again, accelerating slopes suggest extensions of trends in motion. Decelerating trends imply that current trends might be approaching reversal. The 200-day moving average did lose momentum early in 2004, reflecting the weakening stock market that year.

Be sure to check the lengths of pulses and the slope of moving averages that you are tracking. The longer the pulse is, the more vertical the slope is and the greater the odds there are of a continuation in trend. As pulses and slopes moderate, the odds of an imminent market reversal increase.

Using Weekly-Based Longer-Term Moving Averages

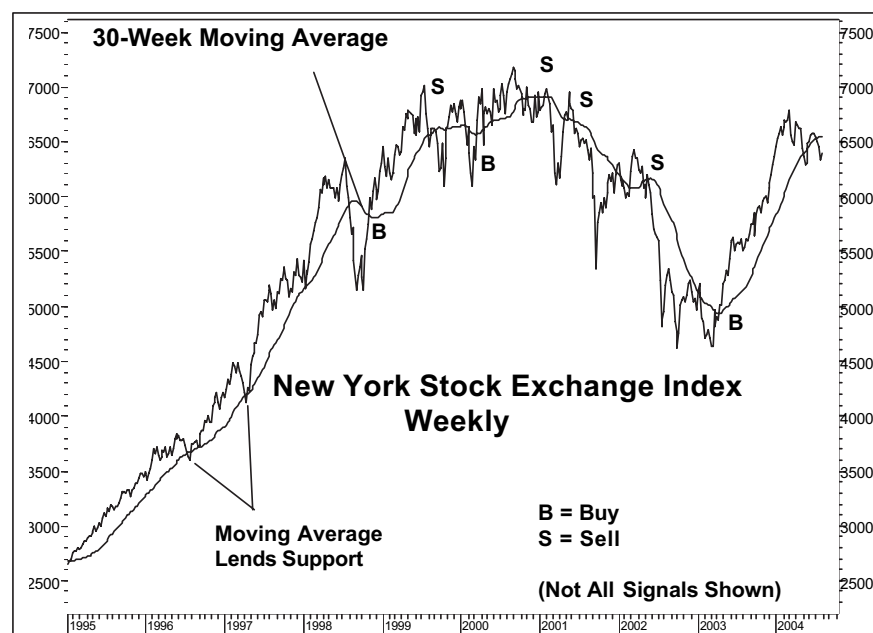


Chart 3.2 The New York Stock Exchange Index Weekly Chart, 30-Week Moving Average

This chart shows the New York Stock Exchange Index of 1995–1997, along with its 30-week moving average. The symbols B and S indicate periods during which upside penetrations of the 30-week moving average proved significant, and periods during which downside penetrations proved significant. These marked penetrations were followed by above-average advances and declines respectively.

Chart 3.2, the New York Stock Exchange Index, is based on weekly price closings and employs a weekly-based 30-week moving average, calculated at the ends of weeks based upon weekly closing price levels. This was a strongly trended period for the stock market, marked by upward action during the late 1990s into 2000, sharply downtrended action thereafter until late 2002, and then a renewal of sharp advances during 2003. To the extent that longer-term trends were more pronounced than usual during this period, the significance of whether prices stood above or below the 30-week moving average was probably greater than normal.

Do you remember the rule regarding diminishing market pulses? You might want to review the long-term buying pulses, reflected by the moving average on the chart. The longest and strongest rising pulse took place between 1996 and mid-1998. This was followed by a sharp decline and then by a second significant upswing between mid-1998 and mid-1999, the pulse of which was *not* as strong as the 1996–1998 advance.

The final upside pulse between late 1999 and early 2000 took place at a more moderate slope than both of the previous two pulses, confirming a weakening of upside momentum in the New York Stock Exchange Index. Price levels and the moving

average flattened quickly, a harbinger of the weakness to come. These are the same patterns that are present in Chart 3.1, the daily price action of the Nasdaq 100 Index.

In both periods, the series of pulses involved were completed in three waves. This three-wave pattern, which occurs frequently, appears to be associated with The Elliott Wave Theory, an approach to studying wave movements and their predictive significance that has a wide following among stock market technicians. We will return to the significance of pulse waves when we examine moving average trading channels, which I consider to be a very powerful market timing tool.

Moving Averages and Very Long-Term Moving Averages

Moving averages, as we have seen, may be applied to shorter-term, intermediate-term, and very long-term price movements. You may also apply them, if you are a very active trader, to intra-day market data for day trading purposes. Such data may be plotted on hourly, 30-minute, 15-minute, and even 5-minute bases, but at this time we are considering longer term applications.

Chart 3.3 is a monthly chart of the Standard & Poor's 500 Index, posted with a 30-month moving average. You should note two items. First, consider the significance of the moving average in providing areas of support for the stock market. During positive market periods, price declines frequently come to an end in the area of key intermediate- and major-term moving averages. Second, note that the accelerating rise in the moving average creates a rising parabolic curve. Such formations usually occur only during very speculative periods (for example, consider the price of gold in 1980) and are generally followed by long-lasting and serious market declines. As you can see, the highs of 2000 had still not been surpassed by early 2004. The peak in gold prices that developed during 1980 has to date remained unchallenged for nearly a quarter of a century.

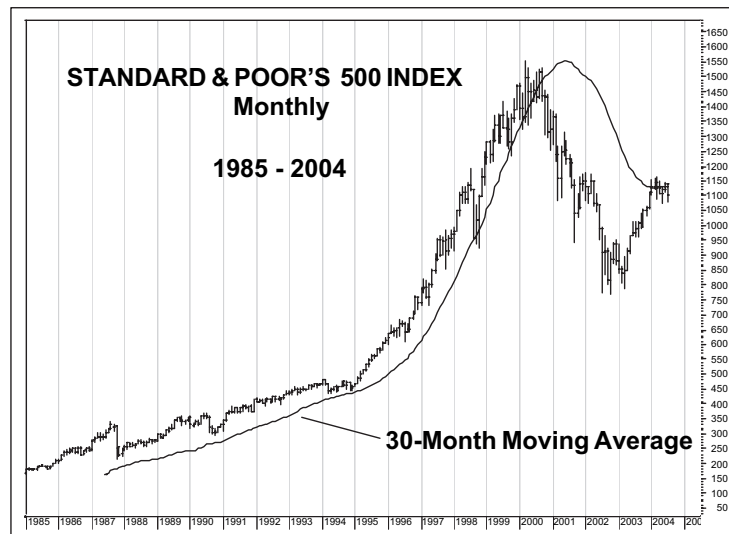


Chart 3.3 The Standard & Poor's 500 Index, 1986–2003 30-Month Moving Average

As illustrated in Chart 3.3, the stock market advanced in an accelerating, parabolic advance between 1986–2000, with the 30-month moving average line providing support throughout the rise. Market tops generally end in gradual decelerations, but sometimes advances are marked by parabolic acceleration, such advances often ending with a spikelike peak. Parabolic patterns of this nature usually take place during highly speculative periods, which are great fun for as long as they last, although they usually do end badly.

Moving Averages: Myths and Misconceptions

It is frequently said that the stock market is in a bullish position because prices lie above their 30-week moving averages or that it is bearish because prices lie below their 30-week moving averages. Sometimes 10-week or 20-week moving averages are referenced instead. There are some elements of truth to these generalizations, but strategies of buying and selling stocks based on crossings of moving averages tend to add only moderately, if at all, to buy-and-hold performance.

For example, consider two possible strategies. The first strategy involves buying the Dow Industrials when its daily close exceeds its 200-day moving average, and selling at the close of days when its close declines to below the 200-day moving average. The second strategy employs the same rules but is applied to crossings of the 100-day moving average.

Trading the Dow Industrials on Moving Average Crossings (January 5, 1970–January 13, 2004)

	200-Day Moving Average Model	100-Day Moving Average Model
Total round-trip trades	120	195
Profitable trades	26 (21.7%)	44 (22.6%)
Unprofitable trades	94 (78.3%)	151 (77.4%)
Average gain, winning trades	14.1%	18.7%
Average loss, losing trades	-1.2%	-1.1%
Percentage of time invested	68.6%	65.5%
Rate of gain per annum while invested	9.6%	9.1%
Gain per annum, including cash periods	6.6%	6.0%
Open drawdown	44.2%	48.1%
Buy and hold: Gain per annum +7.8%; open drawdown -45.1%		

* Gain per annum includes neither money market interest income while in cash, which has averaged approximately 2% per year, nor dividend payments. If these were included, gains per annum for the trading and buy-and-hold strategies would have been essentially equal.

As you can see, there has been very little benefit or disadvantage to trading the Dow Industrial Average based on penetrations of either the 100-day or the 200-day moving averages. The Dow has not been a particularly volatile or trendy market index. The Nasdaq Composite Index, more volatile and trendy, has generally proven in the

past to be somewhat more compatible with this form of timing model, although less so in recent years because this market sector has lost a good deal of its autocorrelation, the tendency of rising market days to be followed by rising market days, and of market-declining days to be followed by market-declining days. Rising and falling days are now more likely to occur in random order than in decades past.

Results of buying on upside penetrations of moving averages and selling on downside penetrations seem to improve if exponential moving averages, which provide more weight to recent than distant past periods, are employed. The construction of exponential averages will be discussed in Chapter 6 when we review The Weekly Impulse Signal. A special application of moving averages, moving average trading bands, a means of predicting future market movement by past market action, has a chapter of its own (see Chapter 9, "Moving Average Trading Channels: Using Yesterday's Action to Call Tomorrow's Turns").

Using Moving Averages to Identify the Four Stages of the Market Cycle

Moving averages can be employed to define the four major stages of the typical market cycle (see Chart 3.4). This identification leads readily to logical portfolio strategies that accompany each stage.

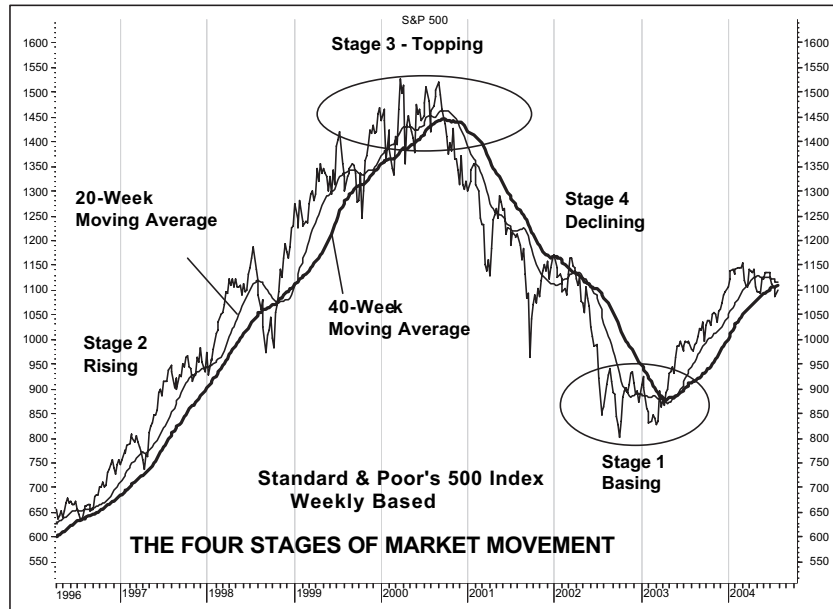


Chart 3.4 The Four Stages of the Market Cycle

Chart 3.4 shows the four stages of the market cycle: rising, topping, declining, and finally basing for the next Stage 2 advance. As you can see, during Stage 2 advances, prices mainly trend above the key moving averages. During Stage 4 declines, prices mainly trend below the key moving averages.

Stage 1

In this stage, the stock market makes a transition from a major bear market to a major bull market. This is a period of base building as the market prepares for advance. This stage encompasses a period that includes, at its beginning, the ending phase of bear markets or market declines that take place during shorter periods. These declines give way to neutral market action as stocks move from late-selling investors to perspicacious investors accumulating positions for the next upswing. In the final phases of Stage 1, the stock market usually begins to inch upward, market breadth readings (measures of the extent to which large numbers of stocks are participating in market advances or declines) improve, and fewer stocks fall to new 52-week lows, the lowest price for each stock over the last 52 weeks.

Patterns of Moving Averages During Stage 1

Shorter-term moving averages begin to show more favorable patterns as longer-term moving averages continue to decline. The downward slopes of all moving averages mediate.

Selling pulses show diminishing length, slope, and momentum. Prices, which have been trailing *below* key moving averages, begin to rally to and through their key moving averages, which themselves become more horizontal in their movement.

Accumulate investment positions during periods of short-term market weakness, in anticipation of a significant trend reversal. There is a good chance that you will be able to assemble your portfolio leisurely because major term Stage 1 basing formations often require weeks and sometimes even months for completion.

Stage 2

Price advances become confirmed by the ability of the stock market to penetrate initial resistance zones, price areas that previously rebuffed upside penetration. Investors become aware that a significant change in market tone is developing and begin to buy aggressively. This is the best of periods in which to own stocks.

Stage 2 often originates in a burst of strength as prices move upward and above the trading ranges that developed during Stage 1. This is the period during which it becomes widely recognized that a major trend change for the better is taking place and is also usually a period in which selling strategies are unlikely to produce much in the way of benefit.

Patterns of Moving Averages During Stage 2 Advances

Intermediate- and then longer-term moving averages join short-term moving averages in first reversing and then accelerating to the upside. Prices tend to find support at the level of their key moving averages, often moving averages of 25 days to 10 weeks in length. Penetrations to the downside of moving average lines are brief. Buying pulses are longer and at a sharper angle than selling pulses, as measured by the slopes and lengths of moving average waves.

Initiate long positions early in this phase, with plans to hold throughout the rising cycle, if possible. The major portion of your portfolio should be in place relatively early in this stage of the market cycle.

Stage 3

The market advance slows, with shares passing from earlier buyers to the hands of investors who are becoming invested late. This period is marked by distribution, when savvy investors dispose of holdings to less savvy latecomers.

Patterns of Moving Averages During Stage 3 Distribution Periods

The shorter-term and, later, intermediate- and longer-term moving averages lose upside momentum and flatten. Price declines carry prices as far beneath as above key moving averages. Uptrends give way to neutral price movement and to neutral patterns in moving average movement. Fewer stocks and industry groups demonstrate rising moving average trends.

In many ways, this is a difficult period for many investors. This is partly because of the insidious way Stage 2 advances often give way to Stage 3 distribution. In addition, many investors, actually more fearful of missing a profit than of taking a loss, are reluctant to concede that the happy bullish party might be coming to a close.

New purchases should be made selectively, with care. Selling strategies for existing holdings should be established, profits should be protected with stop-loss orders, and portfolios should be lightened by selling stocks that have fallen in relative strength. Rallies should be employed as opportunities for liquidation.

Stage 4

Bear markets are in effect. Market declines broaden and accelerate. Short-term and then longer-term moving averages turn down, with downtrends accelerating as bear markets progress. An increasing amount of price movement takes place beneath key moving averages. Rallies tend to stop at or just above declining moving averages. Market rallies do take place and are sometimes sharp but generally relatively brief.

This is the stage during which investors accrue the greatest losses. Stage 4 declines are often, but not always, marked by rising interest rates and usually start during periods in which economic news remains favorable. In its price action, the stock market tends to anticipate changing economic news by approximately nine months to one year, rising in anticipation of improving economic conditions and declining in anticipation of deteriorating conditions. In the former case, initial market advances are usually greeted with some skepticism. In the latter case, still favorable economic news leads investors to ignore warnings provided by the stock market itself.

For most investors, it is probably best simply to maintain cash positions. Serious market declines are usually associated with high interest rates, which can be secured with minimal or no risk. Aggressive and accurate traders, of course, might attempt to profit from short selling. For the most part, it is not advisable to attempt to ride

through major market downtrends with fully invested positions. Although the very long-term trend of the stock market is up, serious bear markets that have reduced asset values by as much as 75% periodically take place.

The Rate of Change Indicator: How to Measure and Analyze the Momentum of the Stock Market

The Concept and Maintenance of the Rate of Change Indicator

Rate of change measurements measure *momentum*, which is the rate at which price changes are taking place. Consider a golf drive, for example. A well-hit ball leaves the tee quickly, rising and gaining altitude quickly. Momentum is very high. Although it might be difficult to estimate the carry of the drive in its initial rise from the tee, it is often possible to determine, from the initial rate of rise of the ball, that this is a well-hit drive, likely to carry for some considerable distance. Sooner or later, the rate of climb of the ball clearly diminishes and the ball loses momentum. At this time, an estimate of the final distance of the drive can be more readily made.

The important concept involved is that rates of rise diminish before declines actually get under way. The falling rate of change of the drive provides advance warning that the ball is soon going to fall to the ground.

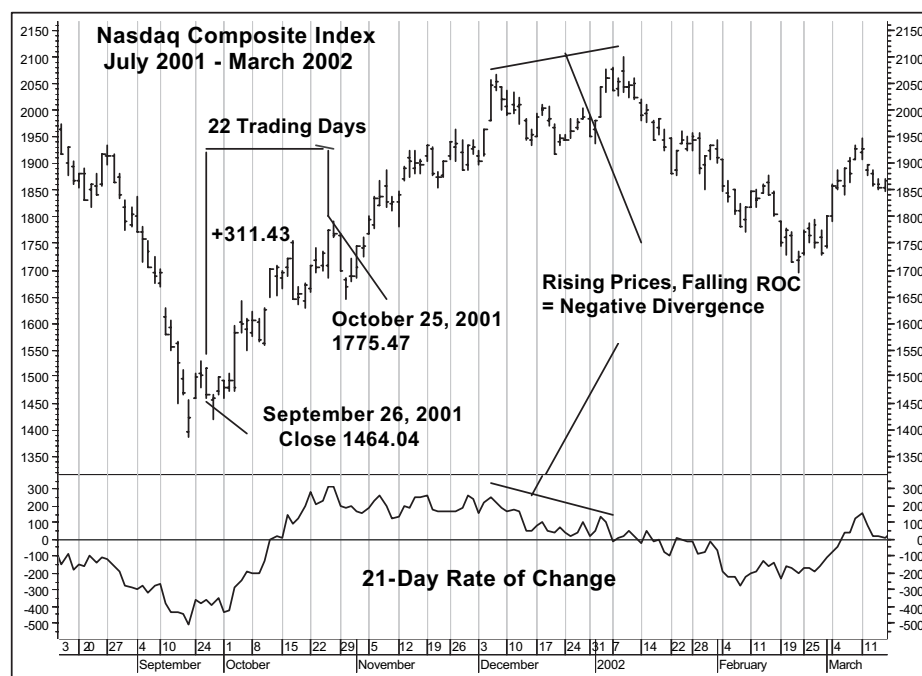


Chart 3.5 The Nasdaq Composite Index 2001–2002

Chart 3.5 illustrates the construction and application of the rate of change indicator. Two dates are marked on the chart: September 26, 2001, at which time the Nasdaq Composite closed at 1464.04, and October 25, 21 days later, at which time the Composite closed at 1775.47. The Composite gained 311.43 over these 21 days of trading; the 21-day rate of change of the indicator on October 25 was +311.43, the rate at which the Nasdaq Composite was advancing. For the most part, rate of change measurements kept pace with price movement between October and early December, with momentum matching price movement. However, rate of change readings fell off sharply as prices reached a new high in January 2002, a failure of momentum to confirm price gain, referred to as a negative divergence. Such patterns are often the precursor to serious market declines.

In its price movements, the stock market often demonstrates momentum characteristics that are very similar to the momentum characteristics of the golf drive.

For example, review Chart 3.5, which covers the period of September 2001 to March 2002. This was a bear market period, but spirited, if usually short-term, market rallies do take place during bear markets. Such an advance took place between late September and early December 2001, when the stock market "golf ball" reached an effective peak in momentum. Momentum had fallen off sharply by the time the "ball" reached its final zenith in early January 2002, giving investors ample warning that the advance was reaching essential completion.

In reviewing the chart, you might notice that the initial lift in prices from the late September lows was accompanied by sharply rising rate of change readings. Momentum did not peak until five weeks had passed since the onset of the market rise, tracking thereafter in a relatively high and level course until early December, when a downward trend in momentum readings diverged from a final high in price levels.

This pattern of price levels reaching new highs as momentum readings fail to do so is referred to as a negative divergence. The divergence carries bearish implications because of the decline in power suggested by the failure of momentum readings to keep up with market advances. A converse pattern, with price levels falling to new lows while momentum readings turn upwards, reflects declining downside momentum and is referred to as a positive divergence because of its bullish implications.

Of course, additional concepts are involved in the interpretation and use of rate of change readings—not to mention a neat short-term timing model based on such measurements. However, first matters first...

Constructing Rate of Change Measurements

Rate of change measurement was discussed in the last chapter when we covered the yield indicator, but there is no harm in a refresher course. Rate of change measurements can be made for any period of time and can be based on hourly, daily, weekly, or monthly data. In my own work, I frequently employ daily closing prices of key market indices or levels of the advance-decline line (a cumulative total of advances minus declines on the NYSE or on Nasdaq) as my data stream.

I have found ten-day rate of change readings to be helpful for shorter-term trading and 21-day to 25-day rate of change readings to be useful for intermediate-term

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trading. It is helpful to maintain both shorter- and longer-term rate of change measurements. Often changes in direction in the shorter-term readings presage subsequent changes in the direction of longer-term rate of change measurements.

Here is how your worksheet might look if you were maintaining a ten-day rate of change indicator stream of the Standard & Poor's 500 Index from January 30th into February 2004.

Date	Closing Level, S&P 500	10-Day Rate of Change
1 January 30	1131.13	
2 February 2	1135.26	
3 February 3	1136.03	
4 February 4	1126.52	
5 February 5	1128.59	
6 February 6	1142.76	
7 February 9	1139.81	
8 February 10	1145.54	
9 February 11	1157.76	
10 February 12	1152.11	
11 February 13	1145.81	+14.68 (Day 11, 1145.81 – Day 1, 1131.13)
12 February 17	1156.99	+21.73 (Day 12, 1156.99 – Day 2, 1135.26)

As you can see, a data stream of at least one unit more than your rate of change measurement is required for maintenance, so for a ten-day rate of change reading to be secured, at least eleven days of data must be maintained.

It is useful to plot both price and rate of change readings on the same chart sheet, to identify divergences, create trendlines, and so on. Daily rate of change lines can be rather jagged, so moving averages of daily measurements are often useful to smooth out patterns of the indicator.

Let's start this section with Chart 3.6, which illustrates a number of the major concepts employed in interpreting rate of change measurements.

Bull Market and Bear Market Rate of Change Patterns

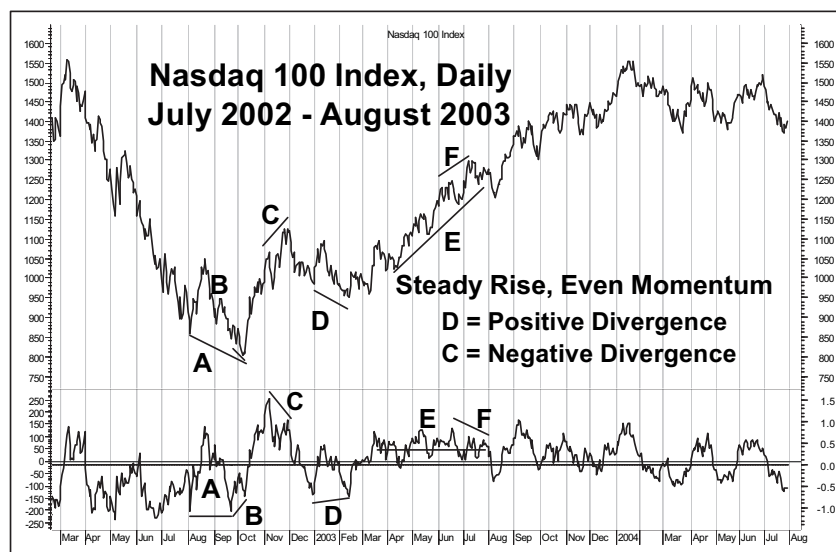


Chart 3.6 Nasdaq 100 Index, Daily, July 2002–August 2003

This chart shows the behavior of rate of change measurements during both bear and bull markets. As you can see, rate of change readings tend to be negative (below 0) during market declines and positive (above 0) during bull markets.

You would naturally expect stock prices to show generally negative rates of change during market declines and generally positive rates of change during market advances. This characteristic of rate of change lines is very apparent in the transition of the stock market from a major bearish trend to a major bullish trend between 2002 and 2003.

Market analysts often refer to the stock market as being “oversold” or “overbought.” By this, they mean that the momentum of the market’s change in price level has become unusually extended in a negative or positive direction, based upon normal parameters of the indicator employed. For example, in recent years, the ten-day rate of change of the NYSE advance-decline line has tended to range between +7,500 and –8,500. Forays beyond these boundaries represent overbought and oversold conditions, respectively. In theory, when measurements of momentum reach certain levels, the stock market is likely to reverse direction, in the same manner that a rubber band, when stretched, has a tendency to snap back to a state of equilibrium.

Popular as this generalization is—and it’s usually accurate enough during neutral market periods—it becomes less reliable in its outcomes when the stock market is strongly trended. For example, the very negative readings in rate of change measurements that developed during the spring and early summer of 2002 portended a greater likelihood of continuing decline than of immediate recovery because readings had become just about as negative as they ever get. Extreme weakness suggests

further weakness to come. Extreme strength suggests further strength to come. Market reversals rarely take place without at least some prior neutralization of rate of change measurements.

Adjusting Overbought and Oversold Rate of Change Levels for Market Trend

The levels at which momentum indicators can be considered “oversold” (with the market likely to try to firm, especially during a neutral or bullish period) and “overbought” (with the market likely to at least pause in its advance, especially during a bearish or neutral period) often vary depending upon the general market climate.

During bullish market periods, rate of change readings rarely reach the negative extremes that can exist for many weeks or even months during bear markets. When they do decline to their lower ranges, the stock market frequently recovers rapidly. During bearish market periods, rate of change readings tend not to track at levels as high as those during better market climates; the stock market more likely declines rapidly when readings reach relatively high levels for bear market periods. Referring to Chart 3.6 again, you can see examples of shifts in the parameters of rate of change indicator levels as the market’s major trend changed direction from bearish to bullish.

When assessing whether momentum indicators suggest an imminent market reversal based on overbought or oversold levels, adjust your parameters based upon the market’s current price trend, moving average direction, and rate of change parameters that are currently operative. These adjustments are, of course, somewhat subjective rather than completely objective.

For the most part, significant market advances do not start when rate of change and other momentum oscillators stand at their most negative or oversold readings. They tend to begin after momentum oscillators have already advanced from their most negatively extreme readings. For example, review Chart 3.6 again. The October 2002 advance did not start until the 21-day rate of change oscillator had already established a rising, double-bottom pattern, the second low point of which was considerably higher than the first.

The end of the November–December market advance (see Chart 3.6) did not start until the 21-day rate of change oscillator had already retreated from its peak levels, with a descending double-top formation created in the process.

The summer 2002 decline did not end until rate of change measurements established a pattern of rising lows (diminishing downside momentum). A positive divergence developed within Area A on the chart; the price level of the Nasdaq 100 Index fell to new lows, whereas its 21-day rate of change level did not. You can also see a minor-term but nonetheless significant secondary positive divergence in Area B, with prices declining to a final low while rate of change measurements became less negative.

The recovery from the lows of September 2002 developed in a classical fashion. The first step was a strong leg upward that carried prices above a resistance area (the peak in August) and momentum readings to high levels, more positive than at any time since March. However, the initial spike came to an end after approximately two months.

Was there a warning of the forthcoming two-month decline? Yes, indeed. Check out Area C on the chart, the area in which prices rose to new recovery peaks in November while rate of change levels declined, a classic negative divergence that foretold developing market weakness.

The decline in the stock market in Area D appeared to be developing from a bearish-looking head and shoulders market top formation (defined in Chapter 6, “Bottom Fishing, Top Spotting, Staying the Course: Power Tools That Combine Momentum Oscillators with Market Breadth Measurements for Improved Market Timing”), but the positive divergence (lower prices unconfirmed by rate of change patterns) that developed in January 2003 argued for a more favorable outcome, which did develop.

Looking Deeper into Levels of the Rate of Change Indicator

The rate of change oscillator conveys a good deal of information in and of itself, but it provides more information if the time is taken to study the market action that created the current reading.

More specifically, each day’s new rate of change indicator level actually involves two variables: the current day’s change in price level and direction of movement, and the level and direction of the price movement of the day that is being removed from the calculation being made.

If the day being removed was a day of market decline, rate of change measurements will turn upward even if today shows no gain in price, for as long as it shows lesser loss than the day being removed. Therefore, if weaker market periods are being eliminated from rate of change calculations, rate of change levels tend to rise easily, often before price trends turn upward. If today happens to be a rising day and the day eliminated from the calculation was a falling day, rate of change measurements might rise rapidly.

Conversely, if the days being removed from your calculations were days of market advance, it will be more difficult for your rate of change indicator to gain ground. During strong market periods, rate of change indicators are likely to track sideways, but at relatively high levels. It might appear at such times that negative divergences are taking place, but if you examine the data stream carefully, you might notice that the stock market is not really weakening at all and that, in fact, the ability of its rate of change readings to remain high is a sign of strength.

Let’s go back to Chart 3.5. September was a period of sharply declining stock prices, so rate of change levels rose quickly in October, even prior to price gains of any significance. Not until the turn of the month into November were the days being eliminated in the calculations rising market days. Rate of change measurements remained flat, though high for several weeks. The inability of rate of change measurements to advance further was, in this instance, not a sign of market weakness, but rather simply a reflection of the ongoing strength that had been maintained over several weeks.

Relative strength readings (Chart 3.5) did not seriously begin to fail until the end of 2001, when, after a dip, prices rose to new highs while rate of change measurements clearly failed to do so. Prices and rate of change measurements declined

simultaneously early in 2002, the decline preceded by the negative divergence that had developed between December 2001 and January 2002.

The first dip down in early December, accompanied by declines in the rate of change indicator, was not necessarily indicative of a more negative market climate. Even the strongest market advances have periods of consolidation. You might notice that at no time did rate of change levels decline below 0 during December. However, a negative divergence, with more bearish implications, did develop at year end.

What made this negative divergence more significant than the flattening of the rate of change indicator during October and November? Well, for one thing, rate of change readings were no longer tracking at high levels, declining to near the zero line. For another, patterns of price movement had changed, with price trends flattening. As a third consideration, there was very little time between the time that the rate of change failed to reach new peaks that would have confirmed new highs in price, and the rapid turndown in price levels from the early January peak.

Again, declines in rate of change readings and the presence of negative divergences are more significant if they are accompanied by some weakening in price trend. Double-top formations in price (two peaks spaced a few days to a few weeks apart) accompanied by declining double top formations in rate of change measurements can be quite bearish.

Conversely, rising patterns in rate of change measurements are more significant if they are confirmed by a demonstrated ability of the stock market to turn upward. Double-bottom stock market formations, spaced a few days to a few weeks apart, accompanied by rising rate of change readings often provide excellent entry points.

The Triple Momentum Nasdaq Index Trading Model

You will now learn about a simple-to-maintain timing model that is designed for use with investment vehicles that track closely with the Nasdaq Composite. This is a short-term, hit-and-run timing model that was invested only 45.9% of the time from 1972 to May 2004, yet it outperformed buy-and-hold strategies during 20 of the 32 years included in the study. Gains per winning trade were more than five times the size of losses taken during losing trades. More performance data is shown afterward, but first you should look at the logic and rules of the model.

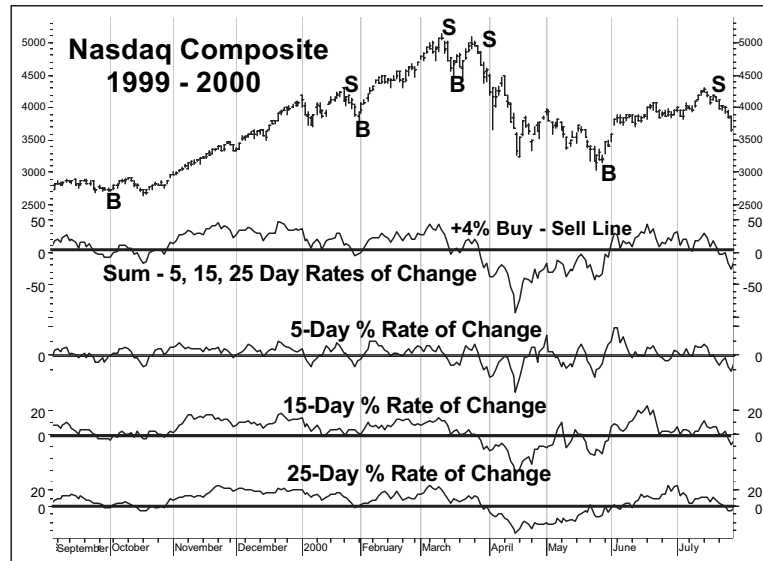


Chart 3.7 The Triple Momentum Timing Model (1999–2000)

This chart shows the Nasdaq Composite from late October 1999 through early October 2000. Below the price chart are three rate of change charts: the 5-, 15-, and 25-day rates of change of the Nasdaq Composite, expressed in percentage (not in point) changes in that index. At the top of those three charts is a chart that is created by summing the daily readings of the separate rate of change measurements. B signifies a buy date, and S signifies a sell date. You might notice that the shorter-term 5-day rate of change indicator leads the longer-term 15-day and 25-day rate of change indicators in changing direction before changes in price direction. (This chart is based upon hypothetical study. There can be no assurance of future performance.)

Maintenance Procedure

The procedure for maintaining this indicator is very straightforward.

You will need to maintain three daily rate of change measurements: a 5-day rate of change of the daily closing prices of the Nasdaq Composite, a 15-day rate of change measurement, and a 25-day rate of change measurement.

These are maintained as percentage changes, not as point changes. For example, if the closing price of the Nasdaq Composite today is 2000 and the closing level ten days previous is 1900, the ten-day rate of change would be +5.26%. ($2000 - 1900 = 100$; $100 \div 1900 = .0526$; $.0526 \times 100 = +5.26\%$.)

At the close of each day, you add the percentage-based levels for the 5-day, 15-day, and 25-day rates of change measurements to get a composite rate of change, the Triple Momentum figure for the day. For example, if the 5-day rate of change level is +3.0%, the 15-day rate of change level is +4.5%, and the 25-day rate of change level is +6.0%, the composite Triple Momentum Level would come to +13.5%, or to +13.5. A reading of this nature, positive across all time frames, would suggest an uptrended stock market.

There is only one buy rule and only one sell rule: You buy when the Triple Momentum Level, the sum of the 5-, 15-, and 25-day rates of change, crosses from below to above 4%. You sell when the Triple Momentum Level, the sum of the 5-, 15-, and 25-day rates of change, crosses from above to below 4%.

Again, there are no further rules. The model is almost elegant in its simplicity. Here are the year-to-year results.

The Triple Momentum Timing Model (1972–2004)

Year	Buy and Hold, Nasdaq Composite	Triple Momentum
1972	+4.4%	+2.3%
1973	-31.1	+7.5
1974	-35.1	-0.3
1975	+29.8	+32.9
1976	+26.1	+23.6
1977	+7.3	+5.3
1978	+12.3	+26.2
1979	+28.1	+25.3
1980	+33.9	+43.2
1981	-3.2	+9.8
1982	+18.7	+43.8
1983	+19.9	+29.4
1984	-11.2	+3.6
1985	+31.4	+31.3
1986	+7.4	+10.7
1987	-5.3	+24.1
1988	+15.4	+11.6
1989	+19.3	+15.2
1990	-17.8	+10.8
1991	+56.8	+32.9
1992	+15.5	+17.9
1993	+14.8	+7.4
1994	- 3.2	+2.0
1995	+39.9	+27.0
1996	+22.7	+20.3
1997	+21.6	+26.3
1998	+39.6	+50.9
1999	+85.6	+43.5

Continued

The Triple Momentum Timing Model (1972–2004) (Continued)

Year	Buy and Hold, Nasdaq Composite	Triple Momentum
2000	-39.3	+8.6
2001	-21.1	+27.5
2002	-31.5	+4.9
2003	+50.0	+21.5
2004 (partial)	-2.3	+ 0.8

Summary of Performance Results

	Buy and Hold	Triple Momentum
Gain per annum	+9.0%	+19.8%
Open drawdown	-77.4%	-17.5%
Round-trip trades		288 (8.9 per year)
Percentage of trades profitable		54.4%
Percentage of time invested		45.9%
Rate of gain while invested, annualized	+9.0%	+ 43.1%
Average gain per profitable trade		+4.8%
Average loss per losing trade		-0.9%
Gain/loss per trade ratio		5.3
Total gain/loss ratio		6.2

Gains achieved by the Triple Momentum Timing Model were more than six times the amount of loss over this 32-year period. The model outperformed buy-and-hold by an average of 120% per year while being invested only 45.9% of the time. Interest income derived at other times is not included in these calculations, but, for that matter, neither are possible trading expenses or negative tax consequences that accrue from active as opposed to passive stock investment.

The question might naturally arise whether it is really necessary to employ three rates of change measurements in this system or whether just one might do the job as well. Actually, using three measurements seems to provide smoother results, with less trading and risk. For example, if the Nasdaq Composite was purchased on days that the 15-day rate of change alone rose from below to above 0 and sold on days that it fell below 0, the average annual gain would have been +18.3%, the maximum drawdown would have risen to -28.6%, the number of trades would have risen to 307, and the accuracy would have declined to 44.3%. Rates of return while invested would have fallen from 43.1% to 30.7%, and profit/loss ratios per trade would have declined from 5.3 to 4.1. Comparisons with other alternative single rate of change strategies seem to produce similar results.

This timing model has stood the test of time very well. Stock market technicians and timing model developers have found that, in many cases, there have been

deteriorations in the performance of stock market timing models in recent decades. Models that worked well during the 1970s began to lose performance during the 1980s, lost more during the 1990s, and lost even more during the bear market of 2000–2002. Losses in efficiency have possibly resulted from rising daily market volatility over the years, increasing trading volume and day trading activity, a considerable reduction in day-to-day trendiness in the various stock market sectors, and probably other factors as well.

You might find it reassuring to observe that the Triple Momentum Timing Model has shown consistent performance relative to buy-and-hold strategies over the past three decades, outperforming buy-and-hold most years during the 1970s and the 1980s, and since 2000. During the 1990s, there were five years in which buy-and-hold strategies outperformed Triple Momentum, and five years in which the model outperformed buy-and-hold. In assessing the value of the model, you might want to recall that it is invested only 45.9% of the time.

Notes Regarding Research Structure

By their nature, research designs employed in creating this sort of timing model tend to involve processes that often produce results that have been optimized for the period of time covered by the research data and that are not equaled in real time going forward. A way to reduce, if not totally eliminate, these problems connected with optimization is to test a model in two or more stages. Parameters are set based on one period of time and then are applied to subsequent periods of time to see if the model continues to perform as well in a hypothetically established future as in the past.

The Triple Momentum Timing Model was created and tested in the following manner. First, parameters were established based upon the time period of September 1972 to December 31, 1988. These parameters were then applied to the remainder of the test period, January 1 1989 to May 5, 2004. Comparative results are shown here.

The Triple Momentum Timing Model Performance by Period

	Period Used for Creation September 1972–December 1988	Forward Testing Period January 1989–May 2004
Returns, buy and hold	+7.6%	+11.3%
Annual returns, trading	+19.7%	+19.6%
Number of trades	128 (7.8 per year)	162 (10.6 per year)
Percentage profitable trades	56.3%	51.9%
Percentage of time invested	43.4%	48.6%
Return while invested	45.3%	40.9%
Open drawdown	–6.9%	–17.5%
Average gain/average loss	8.0	4.1
Average gain per trade	+2.5%	+1.9%

Although there was a certain amount of deterioration in performance between the creation period (1972–1988) and the subsequent test period (1989–2004) of the Triple Momentum Timing Model, its performance actually remained relatively stable, given the increase in the daily volatility of the Nasdaq Composite during the 1989–2004 period and the wide and erratic swings up during 1999 and down during the bear market (not to mention the reduction in day-to-day trendiness that has taken place in the Nasdaq Composite since 1999). I have found in my research that very few timing models have maintained their performance in recent years, and that the Triple Momentum model has done far better than most.

Incidentally, research indicates that the principles of the Triple Momentum Model can be applied to other markets as well (for example, U.S. Treasury bonds). Back testing suggests that risks can be considerably reduced with minimal impact on profitability in this very difficult market to trade.

Rate of Change Patterns and the Four Stages of the Stock Market Cycle

Rate of change patterns can be employed in conjunction with moving averages to define the four stages of the stock market cycle. Rate of change readings usually change direction in advance of moving averages; the momentum of price movement generally reverses in advance of changes of price movement.

Charts 3.5 and 3.6 in this chapter provide examples of the behavior of rate of change measurements as significant market trends reverse. Moving averages can be made of daily rate of change measurements to smooth the often-jagged daily fluctuations of this indicator.

To sum up, moving averages, which reflect shorter and longer trends in the stock market, can help investors define the strength in the market by their direction, their slope, and the angle and length of their pulses upward and downward. Rate of change measurements, which define the momentum of market advances and decline, often provide advance warning of impending market reversals, as well as a measure of the strength of trends in effect. Both moving averages and rate of change measurements provide significant indications of the four stages of major and shorter-term market cycles.

