

January 7, 2002

# Stock Market Report – 2001 Review

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Market Analysis for Period Ending Monday, December 31, 2001

This document presents technical and fundamental analysis commonly used by investment professionals to interpret direction and valuation of equity markets, as well as tools commonly used by economists to determine the health of financial markets and their impact on the domestic United States economy. The purpose is to provide a synopsis of equity markets from as many disciplines as possible, but is in no way an endorsement of any one mode of study or source of advice on which one should base investment decisions.

Definitions of terms and explanations of indicator interpretation follow the charts in the Endnotes section.

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## Technical Trends

Figure 1 presents price trends and daily volumes for the New York Stock Exchange and Nasdaq Composite Indices.

The New York Stock Exchange Composite Index (NYSE Index) closed Monday, December 31 at 589.80, a decline of 10.2 percent from the end of 2000. Since a recent high of 663.56 on May 21, the index has lost 11.1 percent of its value. However, the index has risen 17.0 percent since September 21, the low point following the terrorist attacks, and now stands at a level higher than before September 11.

The NYSE index nearly crossed its 200-day moving average line at the end of December, which has not happened since the beginning of June. Typically, a prolonged period of time beneath the 200-day trend line signals a bear market, and most analysts would agree that the second half of 2001 fit that description. The NYSE has been above its 50-day moving average line since early November, coinciding with the post-September 11 rally.

The National Association of Securities Dealers Composite Index (Nasdaq Index) closed at 1950.4. During 2001, the Nasdaq Index fell 21.1 percent. Since the September 21 low, however, the index has increased 37.0 percent. After briefly crossing the 2000-point barrier in December, the Nasdaq is at levels not seen since early August (figure 1).

The Nasdaq index exceeded its 200-day moving average in early December for the first time since September 2000. This

can be explained by both the post-attack rally and by moving further away from the so-called “technology bubble” which inflated Nasdaq price levels in 1999 and 2000. Except for the dip following September 11, the index has remained fairly close to the 2000-point level since the spring.

Figures 2, 3, and 4 present some technical indicators commonly cited by stock market analysts.

As of December 31, the relative strength index (RSI) for the NYSE Composite had a value of 58.5 percent, remaining in what is commonly viewed as neutral territory (figure 2, upper panel). For the Nasdaq Index, the relative strength also remains in the neutral range (lower panel). The RSI seems to have predicted market upturns and downturns fairly well in 2001, reaching oversold territory before the spring and post-attack rallies, and overbought before the summer decline.

The number of stocks falling to new 52-week lows in the NYSE was fairly flat for most of 2001, except for a slight uptick during the spring slump and a sharp increase following September 11. New highs followed the market a bit more closely, though the recent rally has not seen as many stocks reach their high points as did during the April rally (figure 3 upper panel). The momentum oscillator (middle panel) foresaw the two big rallies when it fell sharply into oversold territory, but sharp increases into overbought territory has failed to slow down the rally in November and December. The Market Breadth indicator (figure 3, bottom panel) reached a new high in December, indicating the rally has been widespread.

The number of Nasdaq stocks reaching new lows has been more volatile than NYSE stocks, increasing sharply in March and September, while the new highs has remained fairly flat (figure 4, upper panel). The momentum indicator has flattened out in essentially neutral territory (figure 4, middle panel), though increases into overbought territory accurately foretold declines in the Nasdaq index. Declining stocks still outnumber advancing ones at a fairly constant difference (lowest panel, figure 4).

## **Volatility**

Indicators of market volatility are shown in figure 5.

The Chicago Board of Options Exchange (CBOE) provides daily measures of volatility for the S&P 100 (VIX) and for the Nasdaq 100 (VXN). The VXN was much more volatile than the VIX while the indices declined in March, reflecting the sharper decreases in the Nasdaq 100. Both volatility indicators declined sharply after September 21, when the indices were at their

lowest price levels, and are now at levels similar to those seen in the summer.

Put/Call ratios appear in figure 6.

Monthly data are shown from January through December. The CBOE individual equity put/call ratio was in territory normally interpreted as bullish for most of 2001, even in February and August, the months before sharp declines in the S&P 500. The S&P 100 put/call ratio was neutral for most of 2001, except for the time preceding the post-attack rally (figure 6, top panel).

### **Sector Performance**

Figure 7 compares the performance of the various economic sectors within the S&P 500 as well as other international and style indices.

Each of the S&P 500 economic sectors has seen a positive average performance in the past five years. However, only two of the ten sectors had positive returns in 2001. Information technology, the top performing sector since 1996, lost 26 percent this year. Utilities lost the most in 2001, 32.5 percent. The materials sector has struggled over the past five years, but had a positive return in 2001. The consumer discretionary sector also had a positive return this year, though far below its average return over the past five years (figure 7, upper panel).

The Wilshire 5000, composed of all U.S. equity issues, fell 12.1 percent year-to-date. Foreign indices fared even worse; the German DAX declined 19.8 percent, the British FTSE 100 fell 16.2 percent, and the Japanese Nikkei 225 lost 23.5 percent of its value during 2001 (figure 7, middle panel).

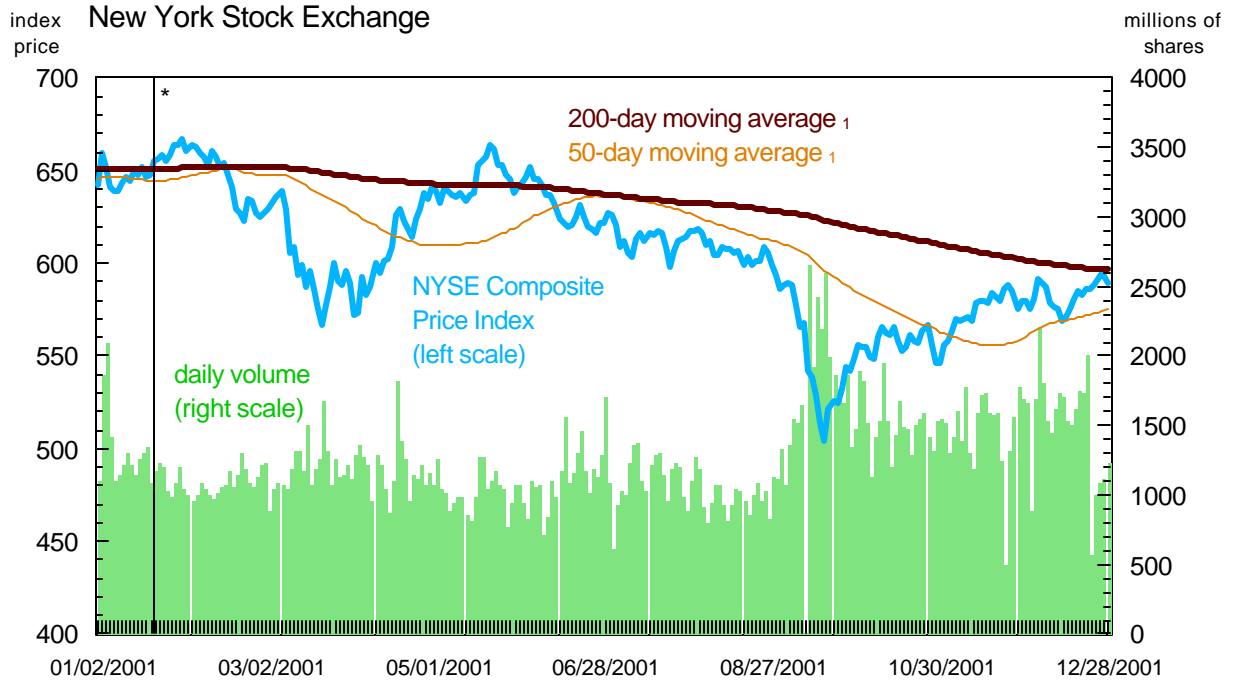
Over the last five years the Russell 1000 Large-Cap Index returned 15.0 percent, while the 2000 Small-Cap Index returned on average 8.7 percent annually. In 2001, however, the 1000 Large-Cap Index depreciated 13.6 percent, while the Russell 2000 Small-Cap Index appreciated 1.0 percent. The Russell 1000 Growth index, after returning on average 15.2 percent annually, declined 20.9 percent. Value stocks also declined in 2001, according to the Russell 1000 Value index (figure 7, lower panel).

### **Valuation**

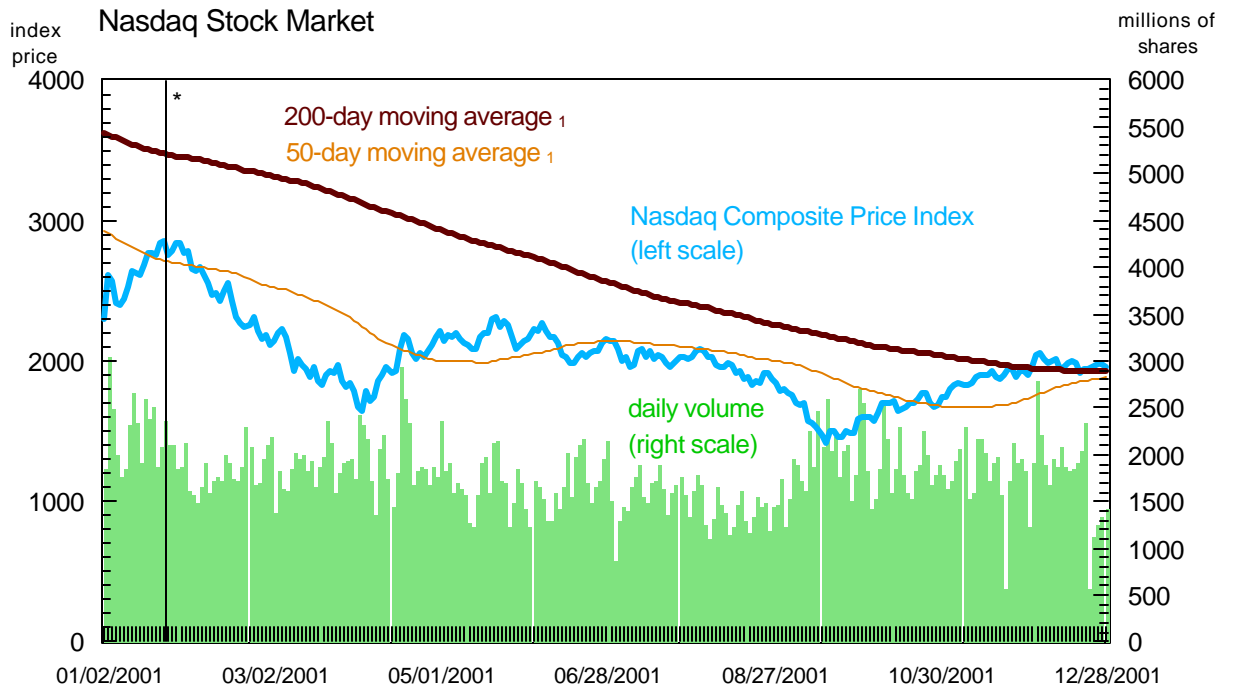
Figure 8 shows three measures of historical and future valuation: historical PE ratios in the top panel, forward and trailing PE ratios using analysts' estimates of operating earnings in the middle panel, and strategists' two-year forecasts of earnings growth in the lower panel.

The macro projections from strategists for the growth of earnings for the Standard and Poor's 500 index over the next two years have been revised downward to 18.3 percent in the fourth quarter, above the 6.7 percent historical average annual growth rate. The **S&P 500 trailing price-earnings ratio** decreased to 31.9 in the fourth quarter from 39.9 in the third quarter. During the same period the price-earnings ratio for the Wilshire 5000 increased to 31.3 from 24.1. The fourth quarter forecast for the **S&P 500 forward price to operating earnings ratio**, using bottom-up forecasts from analysts, increased to 22.3 from 19.8 in the third quarter (figure 8).

Figure 1  
 Daily Trends of Major U.S. Stock Exchanges



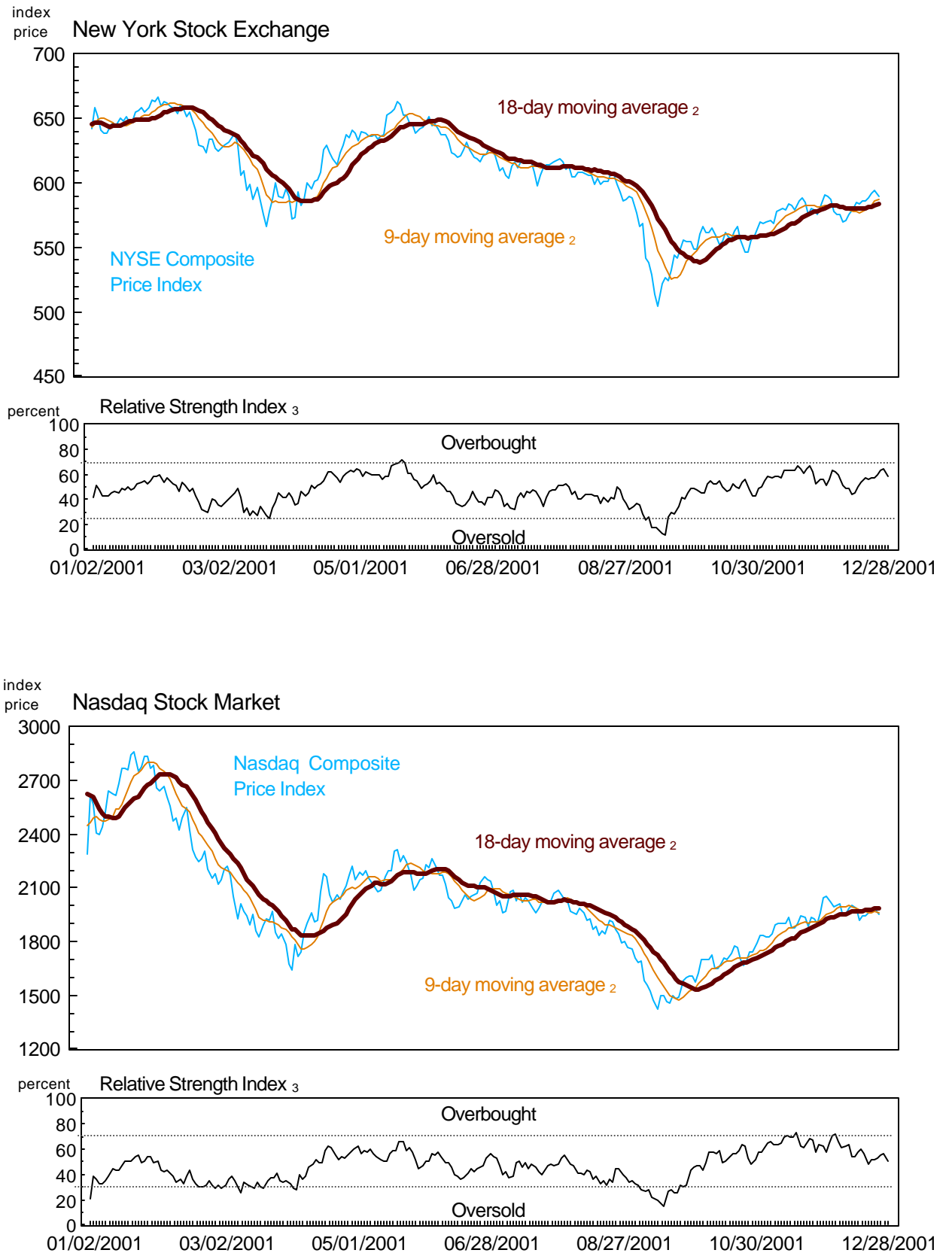
\* New York Stock Exchange Composite Index closed at 656.26 on January 24.



\* Nasdaq Composite Index peaked at 2859.15 on January 24.

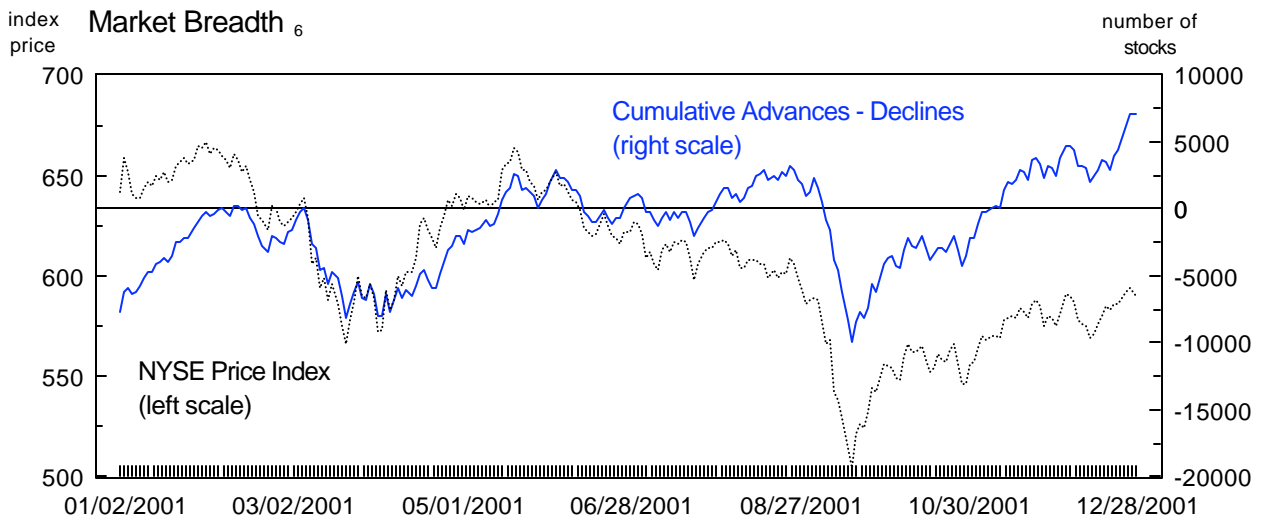
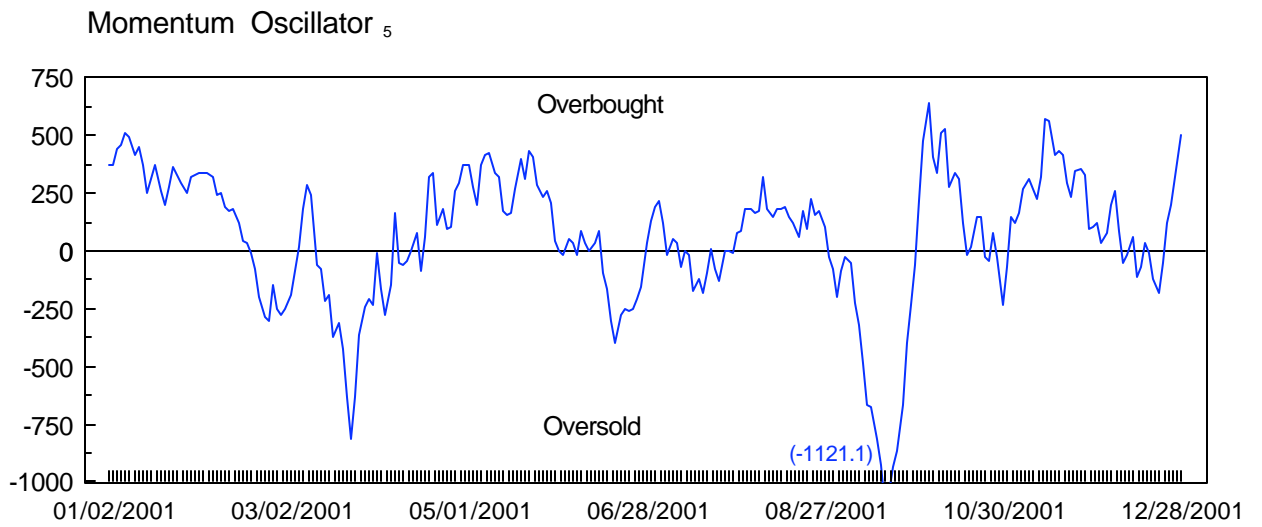
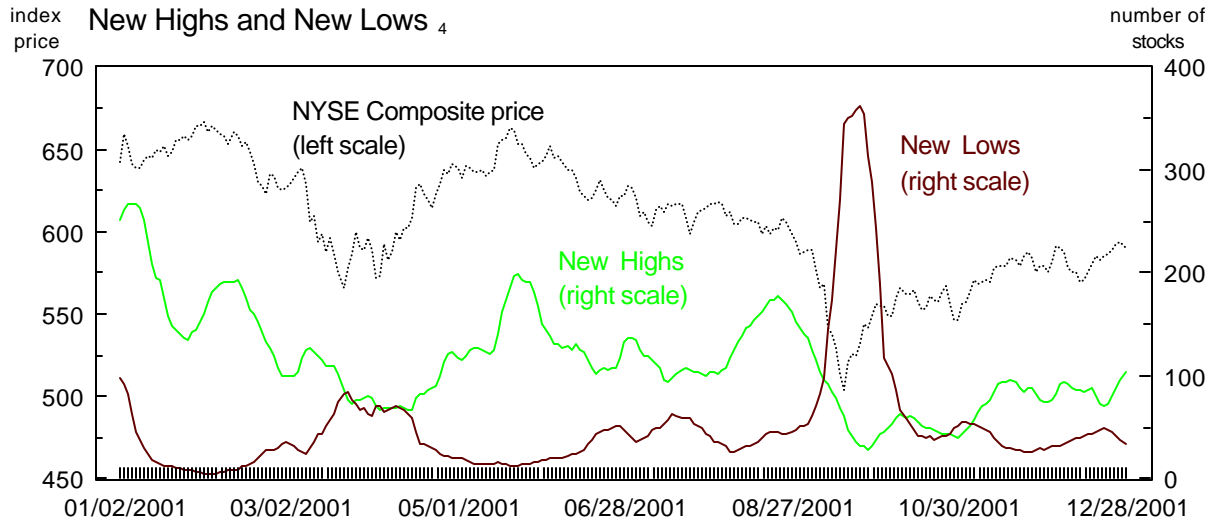
Source: Bloomberg, L.P.

Figure 2  
 Moving Averages and Relative Strength



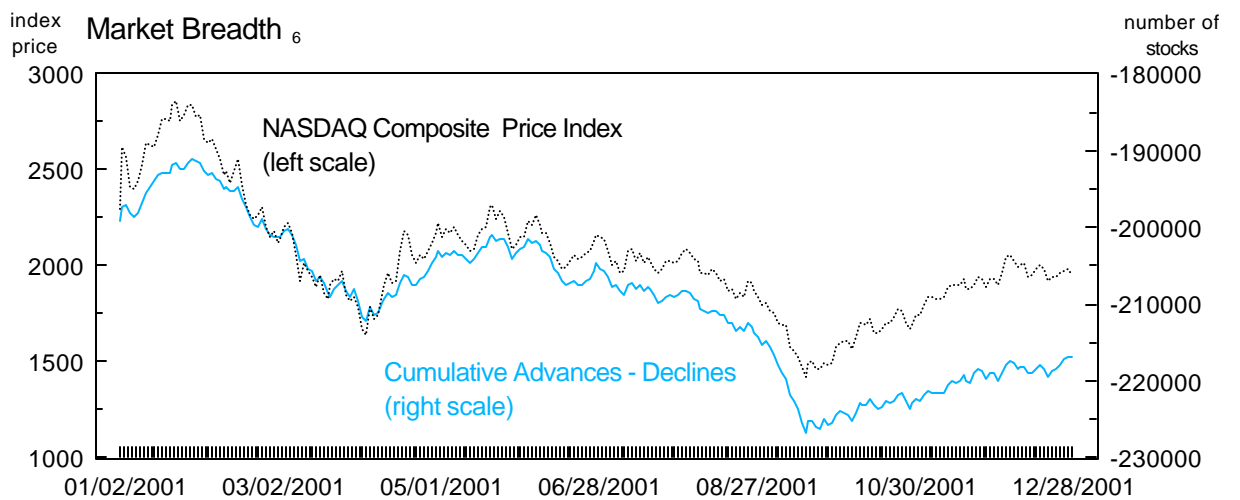
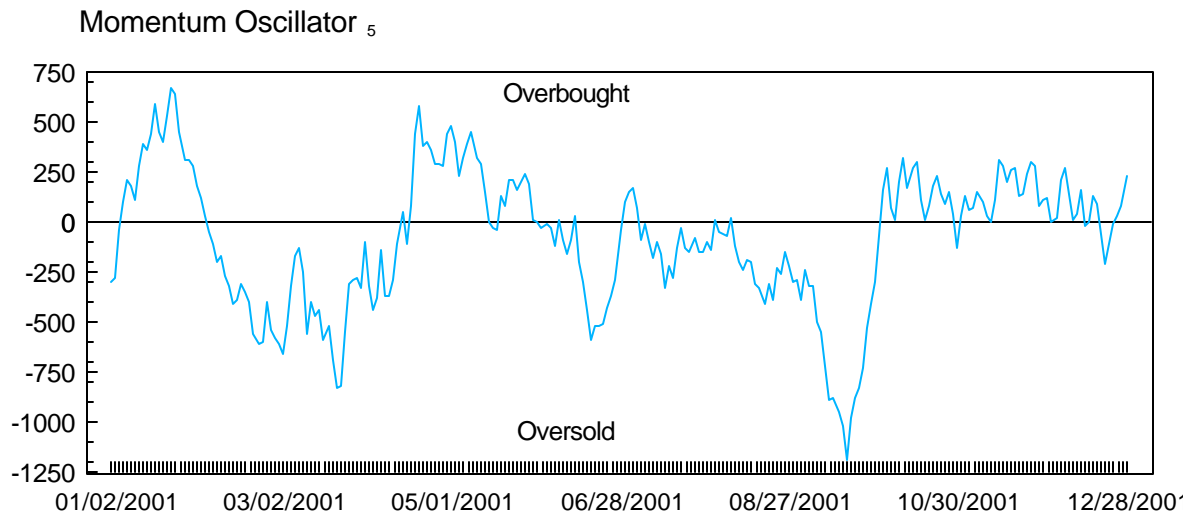
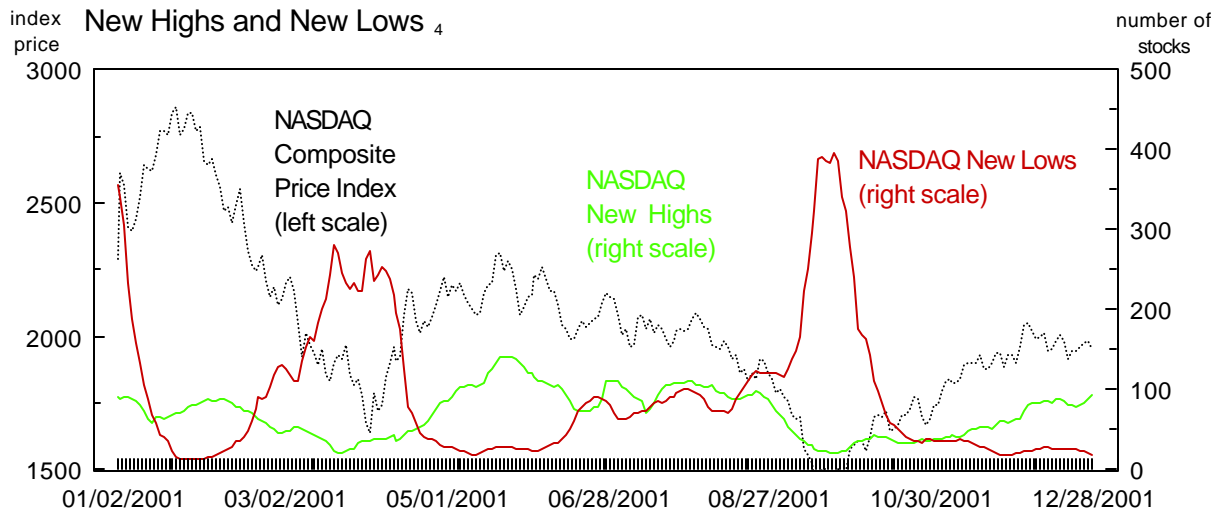
Source: Bloomberg, L.P.

Figure 3  
 Index Breadth and Momentum Indicators -  
 New York Stock Exchange



Source: Bloomberg, L.P.

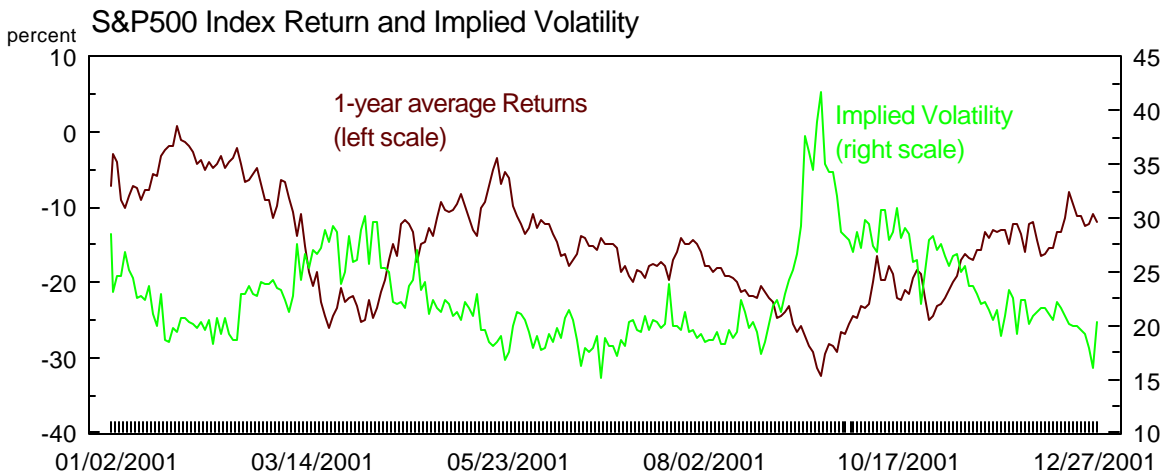
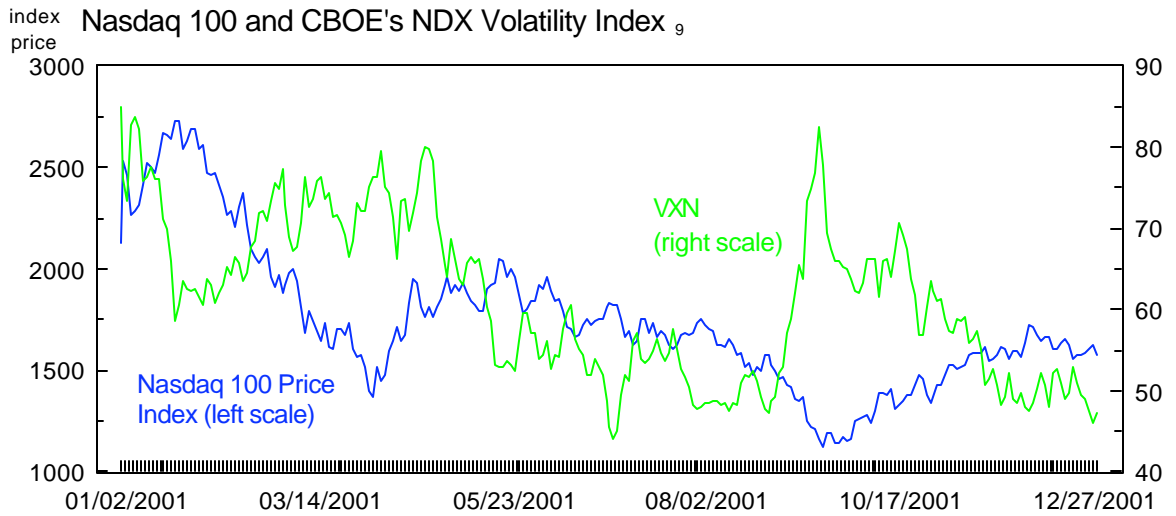
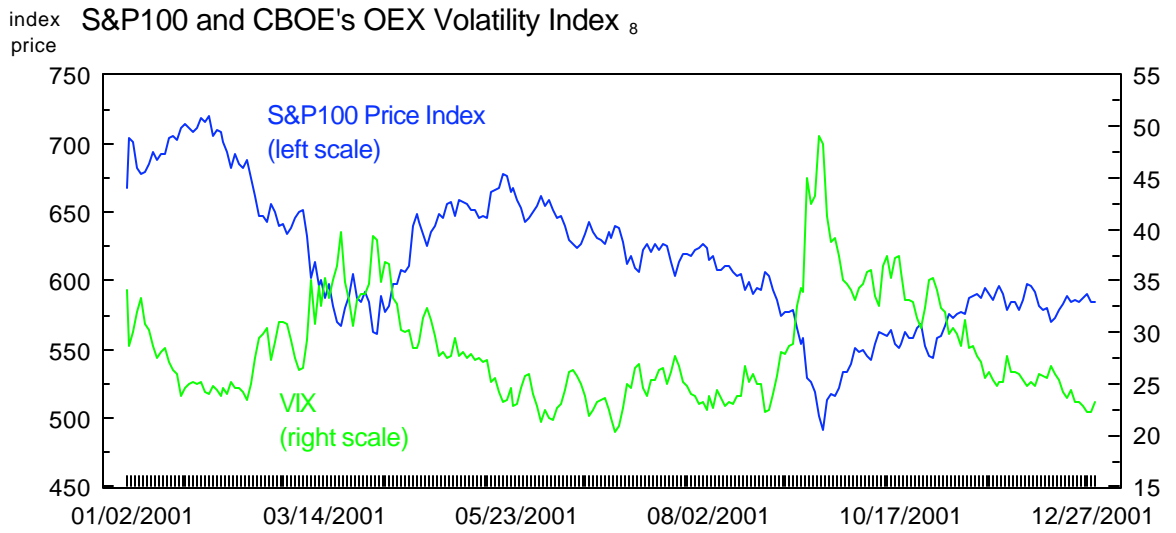
Figure 4  
 Index Breadth and Momentum Indicators -  
 Nasdaq Stock Market



Source: Bloomberg, L.P.

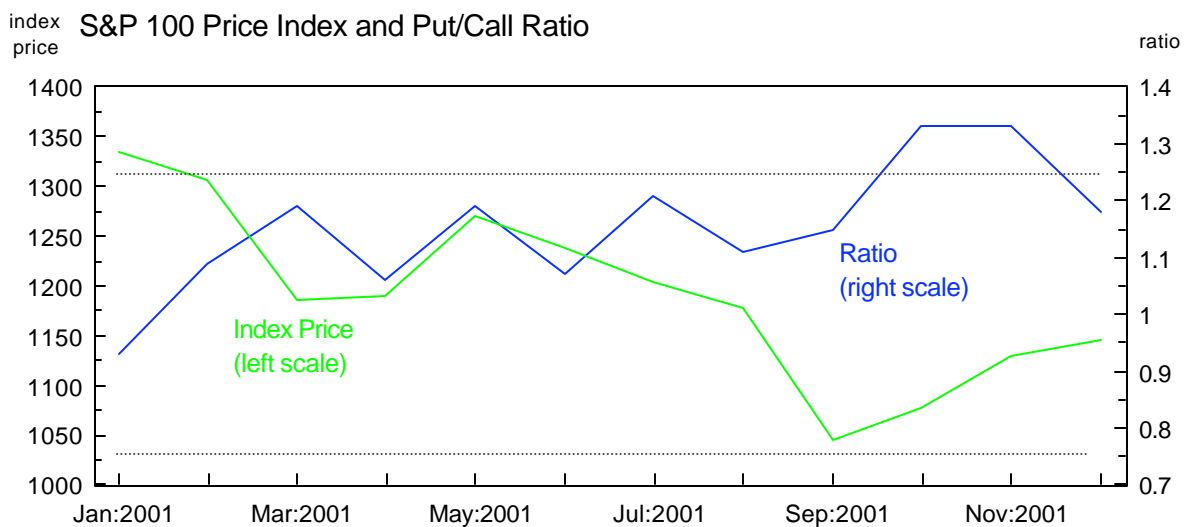
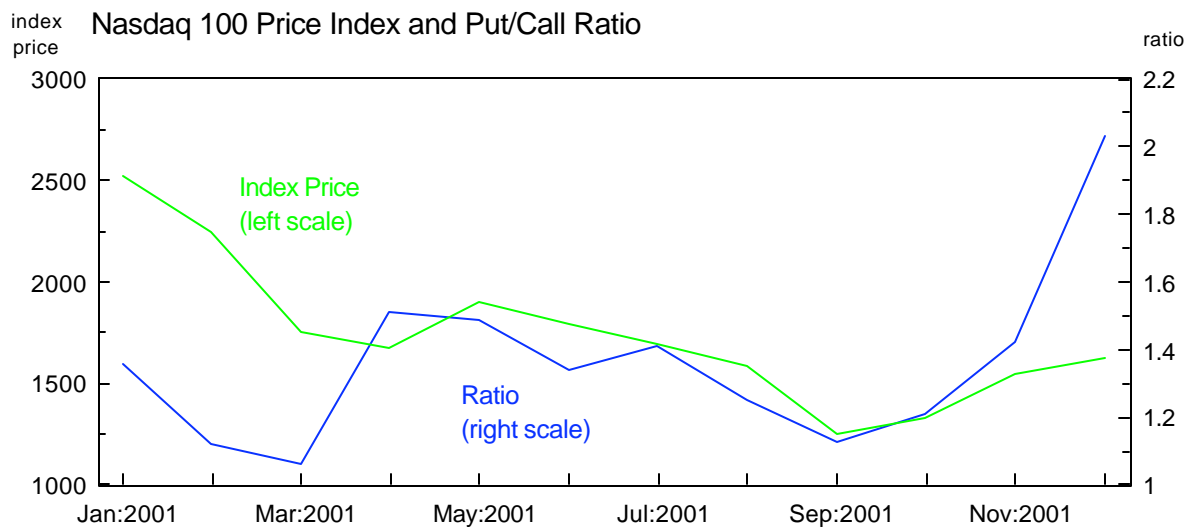
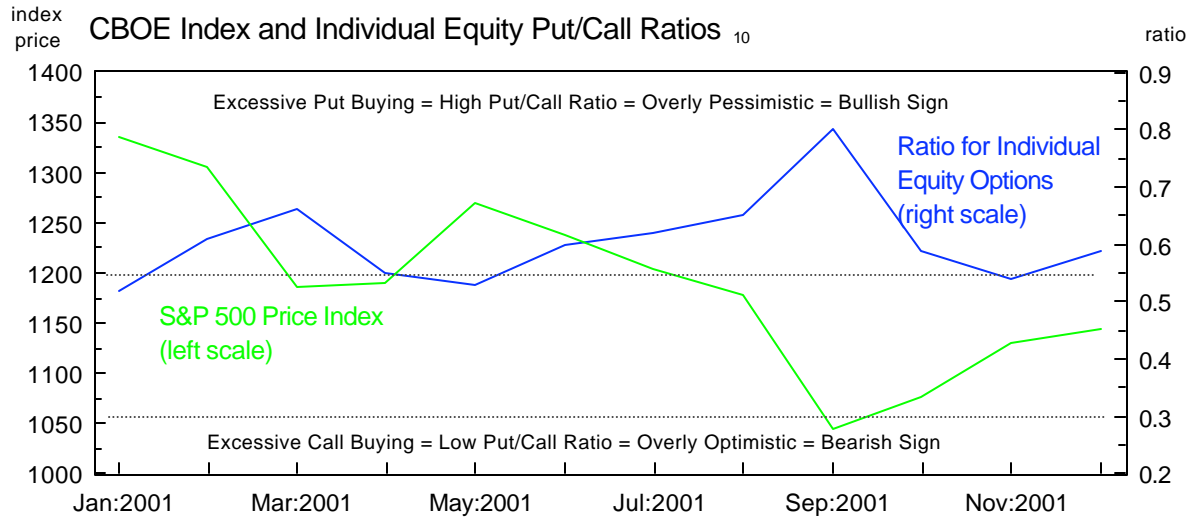


Figure 5  
Volatility <sub>7</sub>



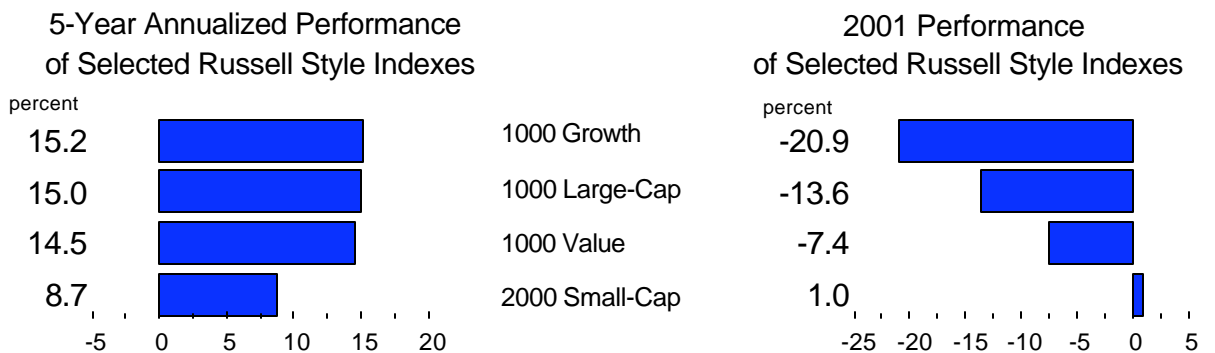
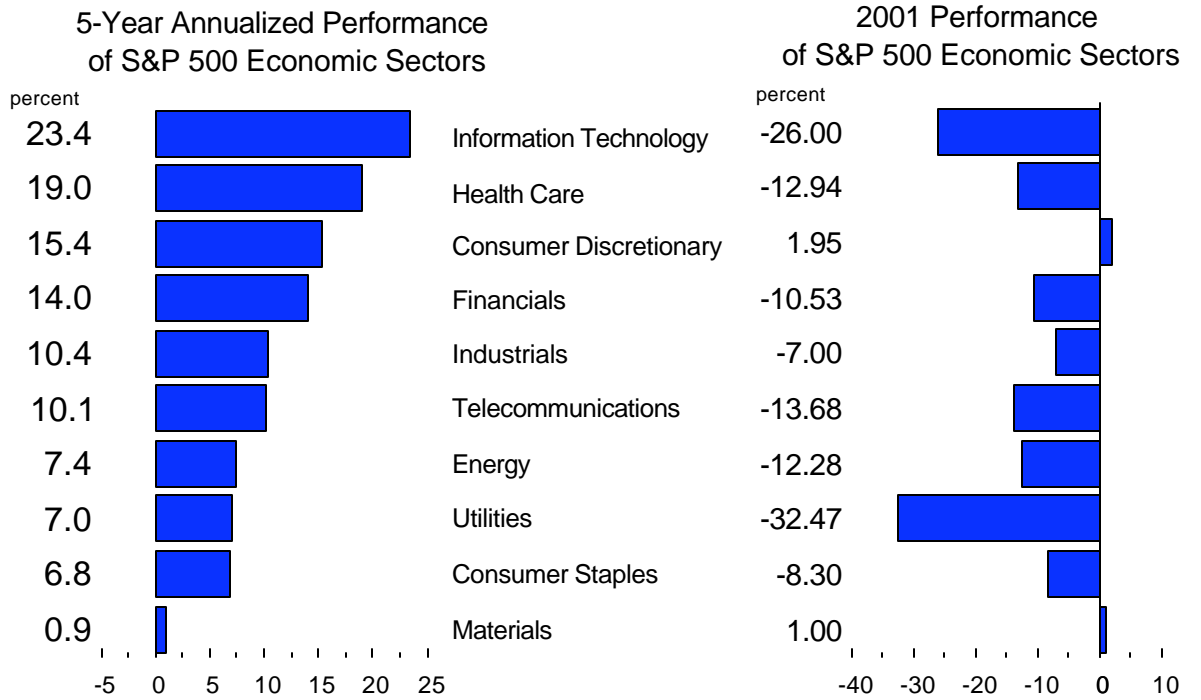
Source: Bloomberg, L.P.

Figure 6  
Put / Call Ratio



Source: Haver Analytics

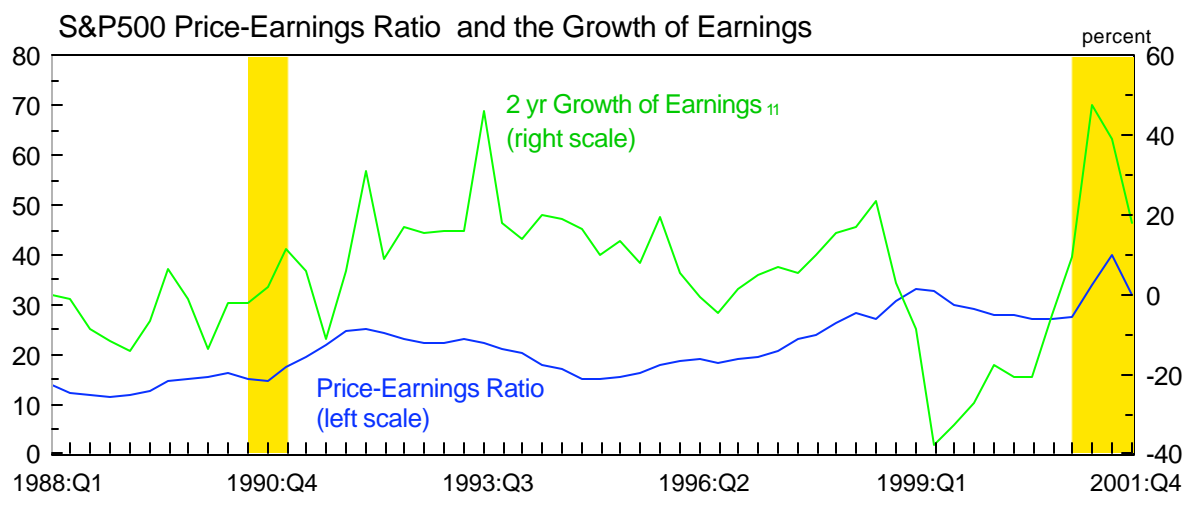
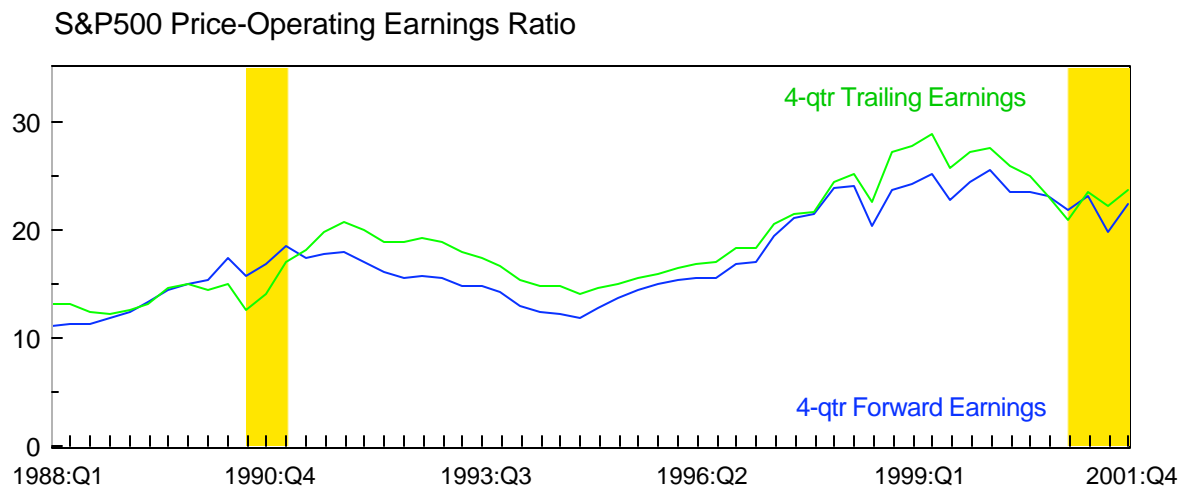
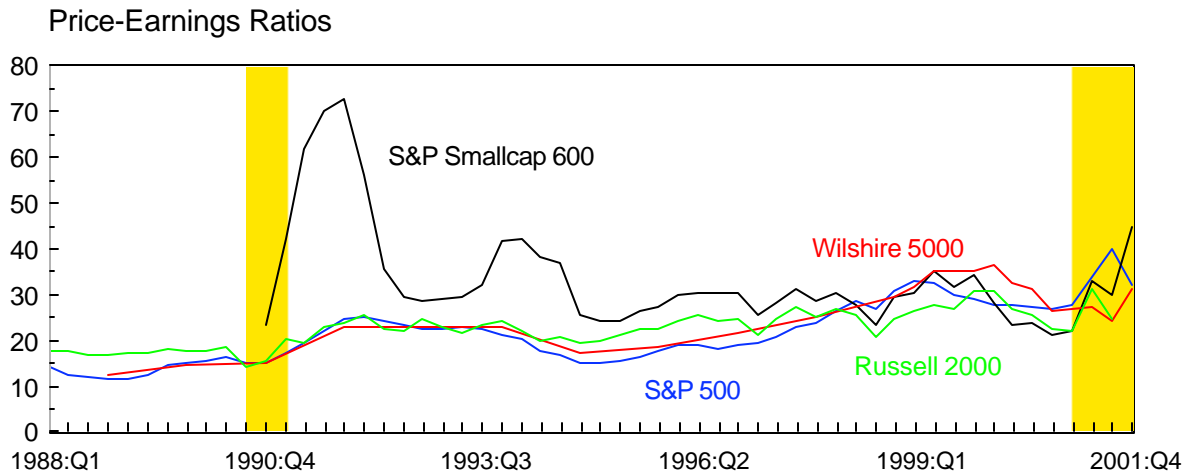
Figure 7  
 S&P 500 Economic Sectors - Index Returns



Source: Bloomberg, L.P.

Figure 8

PE Ratios and the Growth of Earnings



Source: First Call, DRI, Bloomberg L.P., Frank Russell Company

## Endnotes

Relationships described in these notes represent the thinking of those analysts who commonly cite these indicators. While many analysts consider these to be commonly used indicators, they are not necessarily endorsed as the prevailing tools used by the analyst community, and have not been validated by anyone at the Federal Reserve Bank of Boston.

1. 50-Day, 200-Day Moving Average: Moving averages represent the average price investors pay for securities over a historical period, and present a smoothed picture of the price trends, eliminating the volatile daily movement. Because these lines offer a historical consensus entry point, chartists look to moving average trend lines of index prices to define levels of support or resistance in the market. When a chart trend is predominantly sideways (Figure 1, top chart), moving averages and the underlying series frequently cross, but during a time of prolonged increase or decrease (bottom chart) the daily prices of a security typically are above or below the trailing average. Moving above or below the 50-day moving average is sometimes associated with rallies or corrections. Similarly, prolonged movements, such as bull and bear markets can be represented by securities remaining above or below their 200-day moving average for prolonged periods of time.
2. 9-Day, 18-Day Moving Averages: The 9-day and 18-day moving averages are often used together to provide buy and sell signals. Buy signals are indicated by the 9-day average crossing above the 18-day when both are in an uptrend. The reverse, the 9-day crossing below the 18-day while both moving averages are declining, is a sign to sell. However, this simple tool can often be misleading because of its dependence on trending markets and its inability to capture quick market turns.
3. Relative Strength Index (RSI): This momentum oscillator measures the velocity of directional price movements. When prices move rapidly upward it may indicate an overbought condition, generally assumed to occur above 70 percent. Oversold conditions arise when prices drop quickly, producing RSI readings below 30 percent.
4. New Highs, New Lows: A straightforward breadth indicator, this is the 10-day moving average of the number of stocks on a given index or exchange making new 52-week highs or lows each day. This indicator also demonstrates divergence. If an index makes a new low, but the number of stocks in the index making new lows declines, there is positive divergence. Technical analysts refer to this as a lack of downside conviction, or a situation where stocks generally fell on a given day, but not by a significant margin that would indicate intense selling pressure and further declines. Conversely, in rising markets if an index makes a new high but the number of individual stocks in that index making new highs does not increase the rally may not be sustained.
5. Momentum Oscillator: Also known as the overbought/oversold oscillator, this

indicator is calculated by taking the 10-day moving average of the difference between the number of advancing and declining issues for a given index. The goal of the indicator is to show whether an index is gaining or losing momentum, so the size of the moves are more important than the level of the current reading. This is first affected by how the oscillator changes each day, by dropping a value ten days ago, and adding one today. If the advance-decline line read minus 300 ten days ago, and minus 100 today, even though the market is down again, the oscillator will rise by 200 because of the net difference of the exchanged days' values. This scenario suggests a trough. On the other hand, if today's reading was minus 500, it would demonstrate an acceleration of across the board selling.

The magnitude in moves is useful when compared with divergence to the index price. If the Dow peaks at the same time the oscillator peaks in overbought territory, it suggests a top. If the index then makes a new high but the oscillator fails to make a higher high, divergence is negative and momentum is declining. If the index at this point declines and the oscillator moves into oversold territory it may again be time to buy. If the index rises but does not make new highs, but the oscillator continues to rise above a previous overbought level, upside momentum exists to continue the rally.

6. Cumulative Advance - Decline Line: Referred to as market breadth, the indicator is the cumulative total of advancing minus declining issues each day. When the line makes new highs a rally is considered widespread, but when lagging a rally is seen as narrow.
7. Volatility: With regard to stock price and stock index level, volatility is a measure of changes in price expressed in percentage terms without regard to direction. This means that a rise from 200 to 202 in one index is equal in volatility terms to a rise from 100 to 101 in another index, because both changes are 1 percent. Also, a 1 percent price rise is equal in volatility terms to a 1 percent price decline. While volatility simply means movement, there are four ways to describe this movement:
  1. *Historic volatility* is a measure of actual price changes during a specific time period in the past. Mathematically, historic volatility is the annualized standard deviation of daily returns during a specific period. CBOE provides 30 day historical volatility data for obtainable stocks in the Trader's Tools section of this Web site.
  2. *Future volatility* means the annualized standard deviation of daily returns during some future period, typically between now and an option expiration. And it is future volatility that option pricing formulas need as an input in order to calculate the theoretical value of an option. Unfortunately, future volatility is only known when it has become historic volatility. Consequently, the volatility numbers used in option pricing formulas are only estimates of future volatility. This might be a shock to those who place their faith in theoretical values, because it raises a question about those values. Theoretical values are only estimates, and as with any estimate, they must be interpreted carefully.

3. *Expected volatility* is a trader's forecast of volatility used in an option pricing formula to estimate the theoretical value of an option. Many option traders study market conditions and historical price action to forecast volatility. Since forecasts vary, there is no specific number that everyone can agree on for expected volatility.
  4. *Implied volatility* is the volatility percentage that explains the current market price of an option; it is the common denominator of option prices. Just as p/e ratios allow comparisons of stock prices over a range of variables such as total earnings and number of shares outstanding, implied volatility enables comparison of options on different underlying instruments and comparison of the same option at different times. Theoretical value of an option is a statistical concept, and traders should focus on relative value, not absolute value. The terms "overvalued" and "undervalued" describe a relationship between implied volatility and expected volatility. Two traders could differ in their opinion of the relative value of the same option if they have different market forecasts and trading styles.
8. CBOE Volatility Index (VIX): The VIX, introduced by CBOE in 1993, measures the Volatility of the U.S. equity market. It provides investors with up-to-the-minute market estimates of expected volatility by using real-time S&P 100 (AMEX: OEX) index option bid/ask quotes. This index is calculated by taking a weighted average of the implied volatilities of eight OEX calls and puts. The chosen options have an average time to maturity of 30 days. Consequently, the VIX is intended to indicate the implied volatility of 30-day index options. Some traders use it as a general indication of index option implied volatility. (Source: CBOE)
9. CBOE Nasdaq 100 Volatility Index (VXN): Like the VIX, the VXN measures implied volatility, but in this case for Nasdaq 100 (NDX) index options, thereby representing an intraday implied volatility of a hypothetical at-the-money NDX option with thirty calendar days to expiration. Both the VXN and the VIX are used as sentiment indicators for the Nasdaq 100 and for the broader market, respectively. Higher readings and spikes generally occur during times of investor panic and at times coincide with market bottoms. Low readings suggest complacency and often occur around tops in index prices.
10. Put / Call Ratios: These ratios are used as contrary sentiment indicators. Unusually high ratio values, indicating much more put buying than call buying, occur when investors are extremely pessimistic and believe the market will continue to fall dramatically, at times from already low levels, and are often considered by analysts to indicate overly pessimistic sentiment. Because so many investors believe prices will continue to fall assets can become undervalued by contemporary valuations, and prices can move quickly back up. This phenomenon in capital markets is exacerbated by the volatility and leverage associated with derivative securities like options.
- The CBOE index ratios track put and call option trade volume for exchange-traded index options like the S&P 500 and Nasdaq 100. These ratios reflect sentiment of professional and institutional strategies because they are typically

used as hedging tools by professional money managers. For example, a trader may purchase Nasdaq 100 puts as protection against loss if she also chose to simultaneously buy the Nasdaq 100 tracking stock (AMEX: QQQ). Her belief is that the Nasdaq 100 will rise, hence the outright purchase of shares, but has hedged her bet by purchasing puts option contracts, which cost a fraction of the underlying asset. Because of this institutional presence there is more put buying of index options compared with individual equity options, and the index put-call ratios are typically above 1. Index readings above 1.25 indicate much put buying and often occur when institutional investors are very pessimistic, and can lead to a short-term rally in response to this extreme negativity. Conversely, index ratios below 0.75 show very optimistic sentiment.

The CBOE equity ratio, however, is composed of trade volume for individual equity options. While both retail and institutional investors purchase individual equity options, this ratio is considered by technical analysts to be an indicator of retail investor sentiment. Because there is less of the large volume put buying associated with institutional hedging, many analysts believe this is a more sensitive indicator of sentiment, especially among individual investors who may be purchasing puts when they actually believe the price of a particular stock will fall rather than as a hedge to a long position in that stock. Readings above 0.6 suggest a rally may occur because too many investors are pessimistic. Traders believe readings below 0.3 show complacent investor psychology and that prices may decline in the future.

11. 2-Year Growth of Earnings: Growth of earnings over subsequent 8 quarters. Current observations use forecast of earnings from macro projections.