# CHAPTER 12

## IT'S ALL UPSIDE! THE MOMENTUM STORY

**Big Mo'**

Martha believed in getting a good start to each day. She was convinced that a day begun well would only got better whereas one begun badly would go downhill. She carried this philosophy into her investing as well. She bought only stocks that had gone up significantly in the months before, believing that the stock's surge would act as inducement for other investors to buy it, thus creating a self fulfilling prophecy. When asked about whether she was worried that the price may have gone up too much, Martha responded that it did not matter to her as long as she could sell to someone else at an even higher price.

Martha noticed that the stocks in her portfolio almost never did as well when she held them as they had before she bought them and that their prices were extraordinarily volatile. She also discovered that even small pieces of bad news sometimes triggered spates of selling in some of her stocks, quickly wiping out any potential gains she may have made in the prior weeks. Much as she wanted to believe that good things led to more good things, the rule did not seem to work for stocks. Disillusioned, she decided that the market was really not a good place to test out her life philosophy.

*Moral: You live by the crowd, you will die by it.*

Go with the flow. That, in a nutshell, is the momentum story. The underlying theme is that stocks that have gone up in the past are more likely to keep going up than stocks that have gone down in the past. Variations exist, however, in how you measure momentum. Some investors look at the percentage change in stock prices over a period – a week, three months, six months or longer – and buy stocks with the highest percentage increases. Others incorporate trading volume into their investment decisions, arguing that stocks that have gone up on high volume are the best stocks to invest in. Still others build their strategy around earnings announcements, buying stocks after they report better than expected earnings and hoping that the resulting price increases spill over into the following days.

In this chapter, you will look at the basis of the momentum story as well as empirical evidence that has accumulated over time on its effectiveness. You will then create a portfolio of stocks with high momentum – price and volume – and consider the potential risks associated with such a strategy.

## The Core of the Story

The momentum story has power because it can be a self-fulfilling prophecy If investors buy into the momentum story and buy stocks that have gone up in the past, these stocks will go up further. The momentum can continue as long as new investors are attracted to the stock, pushing up demand and prices. Thus, the strongest argument for momentum is herd behavior. In general, there are three reasons given for why investors may indulge in this herd behavior and why you should be able to take advantage of it.

- *Investors learn slowly*: If investors are slow to assess the effects of new information on stock prices, you can see sustained up or down movements in stock prices after news comes out about the stock – up movements after good news and down movements after bad news. The investors who are quickest at assessing the effect of information will profit as investors who are slower at assessing impact gradually come on board.
- *Investors learn by watching other investors:* Some investors learn by watching other investors trade rather than by analyzing fundamentals. If you accept this view of the world, sustained price increases accompanied by high trading volume will attract new investors to a stock.
- *Investors weight the recent past much more than they should:* Psychologists have uncovered fairly strong evidence that human beings tend to weight recent information far more than they should and old information far less than they should. In other words, a positive news announcement by a company can lead to a disproportionately large increase in its stock price as investors react to the announcement.

Momentum stories almost invariably are accompanied with a sense of urgency. You need to get on the momentum bus or it will leave, you are told. Not surprisingly, some investors – individual as well as institutional – climb on, afraid of being left behind.

## The Theory

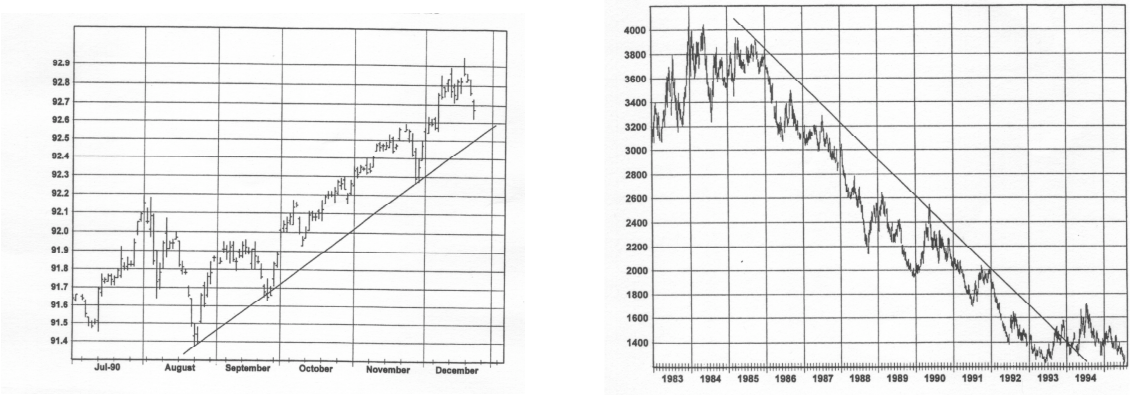
Momentum investing has relatively little theory backing it up, though, as you will see in the next chapter, it has some empirical support. In this section, you will look at some of the measures used by momentum investors and follow up by looking at what you would need to assume about investor behavior for momentum investing to exist.

### Measures used by Momentum Investors

Momentum investors firmly believe that the trend is your friend and that it is critical that you look past the day-to-day movements in stock prices at the underlying long-term

trends. The simplest measure of trend is a trend line. Figure 12.1 contains two trend lines – the graph on the left is for a silver futures contracts over the few months of its existence and the graph on the right is for cocoa futures over a much longer time period.

*Figure 12.1: Trend Lines*




In this silver futures contract to the left, you see an uptrend line, drawn by connecting a series of lows in prices, each one higher than the other. On the right, cocoa prices had been declining over the period in question and a down trend line is drawn by connecting a series of lower highs. As momentum investors, you would buy stocks that are going up and staying above the uptrend line. If the price falls below the uptrend line, it is viewed as a sign that the trend has reversed itself. Conversely, if the price rises above a down trend line, it is considered a bullish sign.

A closely followed momentum measure is called relative strength, which is the ratio of the current price to an average over a longer period (say six months or a year). Stocks that score high on relative strength are therefore stocks that have gone up the most over the period, whereas those that score low are stocks that have gone down. The relative strength can be used either in absolute terms, where only stocks that have gone up over the period would be considered good investments. Alternatively, the relative strength can be compared across stocks, and you invest in stocks that show the highest relative strength – i.e, have gone up the most, relative to other stocks.

These are but two of dozens of technical indicators that are used by momentum investors. Many, like the trend line and relative strength, are based upon past price patterns, but some incorporate trading volume as well.

**Models for Momentum**

There are two different models that generate momentum in stock prices. The first is an information-based model, where investors learn slowly and the effects of news percolates

slowly into market prices. The second is a trading volume based model, where investors learn from watching other investors trade.

***Information Based Model***

In an efficient market, the market price of a stock changes instantaneously when new information comes out about it. Rational investors assess the effect of the information on value immediately and the price adjusts to the new value. While investors make mistakes, the mistakes tend to cut both ways, with the price tending to go up too much in some cases and too little in other cases. If this occurs, there will be no patterns in stock prices after information announcements and no information in past prices.

To see how slow learning on the part of markets will translate into price momentum, assume that a firm reports higher earnings than expected. The stock price will rise on the news and continue to increase as investors slowly assess the effects of information on value. This will translate into a price drift upwards after the earnings announcement. With bad news, you will see the reverse. The stock price will drop on the news announcement and continue to drop as investors gradually adjust their assessments of value.

The peril with this story is that it requires irrationality on the part of investors. If it is indeed true that markets take time to adjust to new information, you could earn high returns by buying stocks right after good news announcements and making money as the price drifts upwards. If enough investors do this, the price will adjust immediately and there will be no price drift after the announcement. Similarly, after bad news, you could sell short on stocks and make money as the price continues to trend down. Again, if enough investors follow your lead, the price will drop after the bad news and there will be no price drift. If you believe in momentum investing you have to come up with a good argument for the persistence of price drifts. With bad news, you can argue that many investors (but not you) are restricted from selling short which would effectively prevent them from taking advantage of slow learning markers. With good news, you have to assume that most investors are either blind to obvious investment opportunities or that the transactions costs are so high for these investors that they drown out potential returns from following the strategy.

***Trading Volume Model***

Investors learn by watching other investors trade. A sophisticated version of a momentum model builds on this theme. An increase in demand for a stock manifests itself in both higher trading volume and increased prices. Other investors observe both the price increase and the higher trading volume and conclude that:

(a) The investors who are buying the stock have proprietary or inside information that suggests that the stock is a under priced

(b) Continued buying on the stock will sustain the price at least for the short term

These investors then buy the stock, pushing up its price. This, in turn, attracts new investors into the company, thus creating a cycle of trading generating more trading, and price increases begetting more price increases over time. The reverse will occur with price decreases.

While both the trading volume and information stories have the same end result of price momentum, there are at least two differences. The first is that the trading volume will generate price momentum even in the absence of new information coming out about a stock. Since investors get to observe the act of trading and not the motivation for the trading, an investor with no special information about a company can get momentum going just by buying a large block of stock. Other investors will observe the trade, assume that there is information in the trade, and put in their own buy orders. The cascading effect on prices will end only when investors realize that there was no informational basis for the first trade. The second is that momentum measures that flow from this view of the world will have to incorporate both price and volume momentum. In other words, you should expect to see price increases or decreases continue only if they are accompanied by above average trading volume.

## Evidence

What is the evidence that market learn slowly? There are three categories of studies that are relevant to answering this question. The first set look at stock prices over time to see if they reveal a tendency to move in the same direction for extended periods of time. The second set look at how markets react to news about the firm – earnings and dividend announcements, for instance – and how prices adjust to the new information. The final set looks at mutual funds and whether there is evidence that mutual funds that have done well in the past continue to do so in the future.

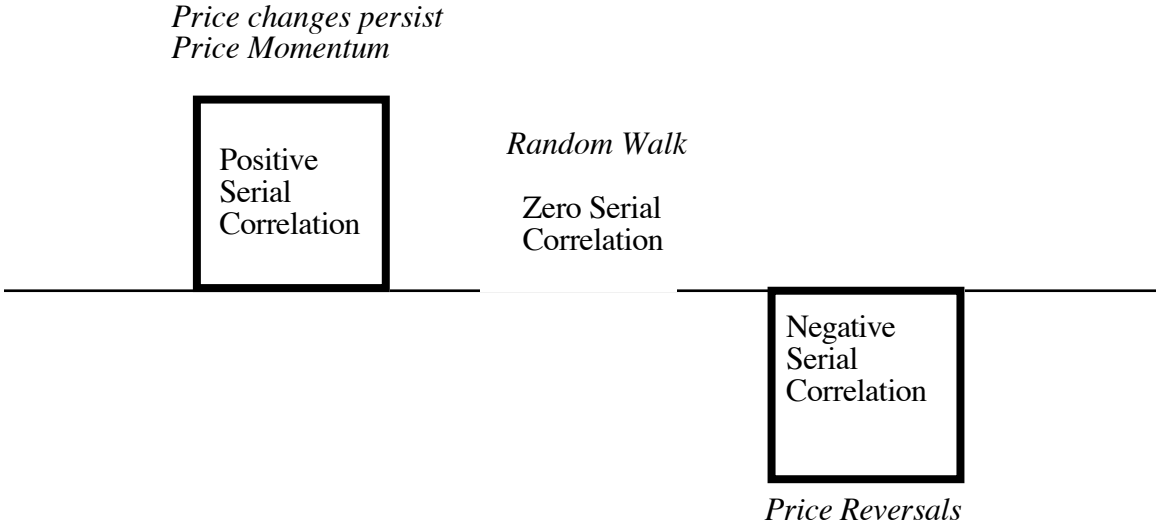
### Stock Price Drifts

In Chapter 8, when looking at contrarian investing, you considered the evidence on whether stocks that have go up are more likely to go down in the future. The evidence that was presented on the correlation between price changes in consecutive periods in that chapter is relevant for momentum investing as well. After all, contrarian and momentum investors take opposite views of the world, and evidence supporting of one strategy has to be viewed as rejecting the other.

***Price Patterns and Serial Correlation***

The serial correlation measures the relationship between price changes in one period and price changes in the next. As noted in Chapter 8, a positive serial correlation would indicate that stocks that have gone up are more likely to continue to go up, whereas a negative serial correlation would indicate that stocks that have gone down are more likely to reverse themselves and go up in the future. Figure 12.2 summarizes these possibilities:

*Figure 12.2: Serial Correlation and Price Patterns*




As a momentum investor, you would want price changes to be serially correlated but are they? The earliest research on serial correlation, quoted in Chapter 8, finds little evidence of serial correlation in short period (daily and weekly) returns. There is some recent research that finds evidence of serial correlation in stock returns over hourly and daily returns, but the correlation is different for high volume and low volume stocks. With high volume stocks, stock prices are more likely to reverse themselves over short periods, i.e., have negative serial correlation. With low volume stocks, stock prices are more likely to continue to move in the same direction – i.e., have positive serial correlation.[2] None of this work suggests that you can make money of these correlations. You will see more evidence of the interrelationship between price momentum and volume later in this chapter.

When you look at serial correlation in returns over longer time periods, there is more evidence for both price momentum and reversal, depending upon how long you make the time periods. Jegadeesh and Titman present evidence of price momentum in stock prices

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[2] Conrad, J.S., A. Hameed and C. Niden, 1994, *Volume and Autocovariances in Short-Horizon Individual Security Returns*, Journal of Finance, v49, 1305-1330.

over time periods of up to eight months – stocks that have gone up in the last six months tend to continue to go up whereas stocks that have gone down in the last six months tend to continue to go down. If you define long term as years, the contrarians win the argument and there is clear evidence of price reversals, especially in five-year returns. In other words, stocks that have gone up the most over the last 5 years are more likely to go down in the next five years.

In summary, the evidence on price run ups suggest that momentum strategies can be exceedingly sensitive to how long a period you measure momentum over and how long you plan to hold the stocks you plan to buy. Momentum can be your friend if you hold stocks for a few months, but it can very quickly turn against you if you hold stocks for too long or too short a time period.

**Information Announcements**

The best support for slow learning markets comes from examinations of how markets react to news reports – earnings and acquisition announcements, for instance. There is evidence that markets continue to adjust to the new information in these reports well after they have come out. For instance, a firm that reports much better than expected earnings will generally see its stock price jump on the announcement and continue to drift upwards for the next few days. The same seems to occur to a target firm in an acquisition. While there are alternative explanations for price drifts, one potential explanation is that markets learn slowly and that it takes them a while to assimilate the information. If the initial news was good – a good earnings report or an earnings upgrade from an analyst – you should expect to see prices continue to go up after the news comes out. If the news was bad, you should expect to see the opposite.

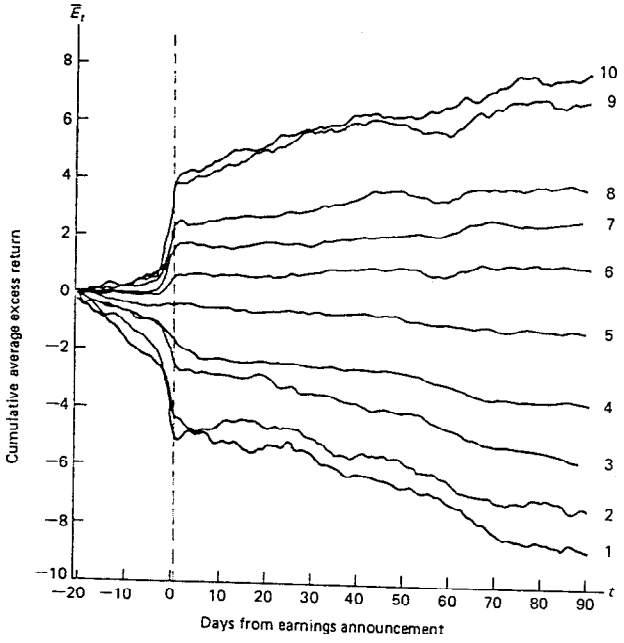
***Earnings Announcements***

When firms make earnings announcements, they convey information to financial markets about their current and future prospects. The magnitude of the information, and the size of the market reaction, should depend upon how much the earnings report exceeds or falls short of investor expectations. In an efficient market, there should be an instantaneous reaction to the earnings report, if it contains surprising information, and prices should increase following positive surprises and down following negative surprises.

Since actual earnings are compared to investor expectations, one of the key parts of any examination of earnings reports is the measurement of these expectations. Some of the earlier studies used earnings from the same quarter in the prior year as a measure of expected earnings, i.e., firms that report increases in quarter-to-quarter earnings provide positive surprises and those that report decreases in quarter-to-quarter earnings provide

negative surprises. In more recent research, analyst estimates of earnings have been used as a measure of expected earnings, and compared to the actual earnings. Figure 12.3 provides a graph of price reactions to earnings surprises, classified on the basis of magnitude into different classes from 'most negative' earnings reports (Group 1) to 'most positive' earnings reports (Group 10). [3]

*Figure 12.3: Price Reaction to Quarterly Earnings Report*




Data from Jones, Latane and Rendleman. Earnings surprises are categorized from biggest negative (1) to biggest positive (10) surprises and returns are computed around date of earnings announcement.

The evidence contained in this graph is consistent with what has been found in most research on earnings announcements -

(a) The earnings announcement clearly conveys valuable information to financial markets; stock prices go up the most after the most positive announcements (10) and go down the most after the reports that contain the most disappointing earnings (1).

(b) There is some evidence of a market reaction in the days immediately prior to the earnings announcement which is consistent with the nature of the announcement, i.e., prices tend to go up on the days before positive announcements and down in the

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[3] Rendleman, R.J., C.P. Jones and H.A. Latene, 1982, *Empirical Anomalies based on Unexpected Earnings and the Importance of Risk Adjustments*, Journal of Financial Economics,

days before negative announcements. This can be viewed either as evidence of insider trading or information leakage.

(c) There is some evidence, albeit weak, of a price drift in the days following an earnings announcement. Thus, a positive report evokes a positive market reaction on the announcement date, and the stock price continues to go up in the days and weeks following the earnings announcement. With negative earnings reports, the stock price drops on the announcement and continues to go down.

While the study quoted above looked at all earnings announcements, there is other research that indicate that the returns associated with earnings surprises are more pronounced with some types of stocks than with others. For instance,

- An examination of value and growth stocks found, instance, that the returns in the three days around earnings announcements were much more positive for value stocks (defined as low PE and PBV stocks) than for growth stocks across all earnings announcements – positive as well as negative. This suggests that you are much more likely to get a positive surprise with a value stock than with a growth stock, indicating perhaps that markets tend to be overly optimistic in their expectations for growth companies.[4]
- Earnings announcements made by smaller firms seem to have a larger impact on stock prices on the announcement date and prices are more likely to drift after the announcement.

***Stock Splits***

A stock split increases the number of shares outstanding, without changing the current earnings or cash flows of the firm. As a purely cosmetic event, a stock split should not affect the value of the firm or of outstanding equity. Rather, the price per share will go down to reflect the stock split, since there are more shares outstanding. One of the first event studies examined the stock price reaction to 940 stock splits between 1927 and 1959 by looking at stock returns in the 60 months around the actual split date. [5]

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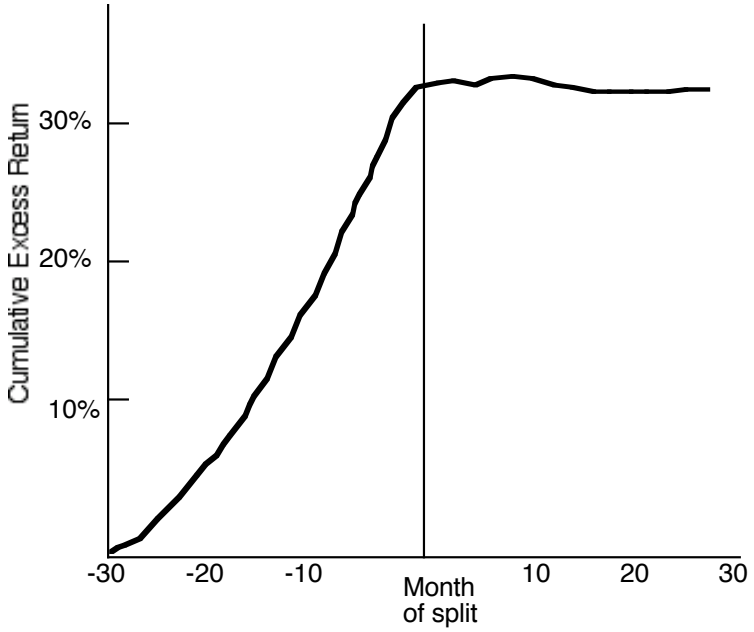
[4] LaPorta, R., J. Lakonishok, A. Shleifer and R. Vishny, *Good news for Value Stocks: Further Evidence of Market Inefficiency*, NBER Working Paper.

[5] Fama, Fisher, Jensen and Roll (1969), "The adjustment of stock price to new information", International Economic Review, 10, 1-21

*Figure 12.4: Market Reaction to Stock Splits*




Data from Fama, Fisher, Jensen and Roll. This is the cumulated excess return around in the 30 months before and 30 months after stock splits.

On average, stock splits tended to follow periods of positive returns; this is not surprising, since splits typically follow price run-ups. No evidence was found of excess returns around the splits themselves, suggesting that the splits were neutral events. One of the limitations of the study was its use of monthly return rather than daily returns. More recent studies that look at the daily price reaction to stock splits find a mild positive effect – stock prices go up slightly when splits are announced.[6] A look at all two for one stock splits between 1975 and 1990 estimated that stock prices increase, on average, 3.38% on the announcement of a stock split and that the announcement effect is much greater for small stocks (10.04%) than for large stocks (1.01%).[7] Researchers attribute this to a signaling effect – i.e. that only companies that expect their stock prices to go up in the future will announce stock splits.

In recent years, some research has pointed out that stock splits may have an unintended negative effect on stockholders by raising transactions costs. For instance, the

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[6] Charest, G., 1978, *Split Information, Stock Returns and Market Efficiency-I*, Journal of Financial Economics, v6, 265-296. and Grinblatt, M.S., R.W. Masulis and S. Titman, 1984, *The Valuation Effects of Stock Splits and Stock Dividends*, Journal of Financial Economics, v13, 461-490.

[7] Ikenberry, D.L., G. Rankine and E.K., Stice. 1996. *What Do Stock Splits Really Signal?*, Journal of Financial and Quantitative Analysis, v31, 357-375. They report that stocks that split continue to earn excess returns in the two years after the split – 7.93% in the first year and 12.15% in the second year.

bid-ask spread which is one component of the transactions costs, is a much larger percentage of the price for a $ 20 stock than it is for a $40 stock.[8] There is some evidence of an increase in transactions costs and a decline in trading volume following splits.[9] This additional cost has to be weighed off against the potential signaling implications of a stock split; investors may view a stock split as a positive signal about future prospects. In an interesting development in the last few years, stocks that have seen their stock prices drop significantly, often to $ 2 or less, have tried to push their prices back into a reasonable trading range by doing reverse stock splits, where you reduce the number of shares outstanding in the company. These reverse stock splits are sometimes initiated to prevent being delisted, a distinct possibility if your stock price drops below a dollar, and sometimes to reduce transactions costs.[10]

***Dividend Changes***

Financial markets examine every action a firm takes for implications for future cash flows and firm value. When firms announce changes in dividend policy, they are conveying information to markets, whether they intend to or not. An increase in dividends is generally viewed as a positive signal, since firms that make these commitments to investors must believe that they have the capacity to generate these cash flows in the future. Decreasing dividends is a negative signal, largely because firms are reluctant to cut dividends. Thus, when a firm cuts or eliminates dividends, markets see it as an indication that this firm is in substantial and long-term financial trouble. Consequently, such actions lead to a drop in stock prices. The empirical evidence, cited in Chapter 2, concerning price reactions to dividend increases and decreases is consistent, at least on average, with this signaling theory. On average, stock prices go up when dividends are increased and go down when dividends are decreased, though the price reaction to the latter seems much more.[11] While the price change on the dividend announcement itself might not offer opportunities for investors (unless they have access to inside information), another study looked at the price drift after dividend changes are announced and found that prices continue to drift up after dividend

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[8] The bid-ask spread refers to the difference between the price at which a security can be bought (the ask price) or the sold (the bid price) at any point in time.

[9] Copeland, T. E. *Liquidity Changes Following Stock Splits*, Journal of Finance, 1979, v34(1), 115-141.

[10] While there are no comprehensive studies of reverse stock splits yet, the preliminary evidence indicates that they are viewed by the market as bad news – an indication that the firm doing the split does not believe that its earnings and fundamentals will improve in the near term.

[11] Aharony, J. and I. Swary, 1981, *Quarterly Dividends and Earnings Announcements and Stockholders' Returns: An Empirical Analysis*, Journal of Finance, Vol 36, 1-12..

increases and drift down after dividend decreases for long periods.[12] Investors may be able to take advantage of this drift and augment returns on their portfolios.

**The Confounding Effect of Trading Volume**

Earlier in the chapter, it was hypothesized that one reason for momentum may be that investors learn by watching other investors trade. As with prices, there is evidence that trading volume carries information about future stock price changes. An analysis in 1998 showed that low volume stocks earned higher returns than high volume stocks, though the researchers attributed the extra return to a liquidity premium on the former.[13] A more surprising result emerges from a look at the interrelationship between price and trading volume.[14] In particular, the price momentum effect that was documented earlier in the chapter – that stocks that go up are more likely to keep going up and stocks that go down are more likely to keep dropping in the months after - is much more pronounced for high volume stocks. Figure 12.5 classifies stocks based upon how well or badly they have done in the last six months (winners, average and loser stocks) and their trading volume (low, average and high) and looks at returns on these stocks in the following six months.

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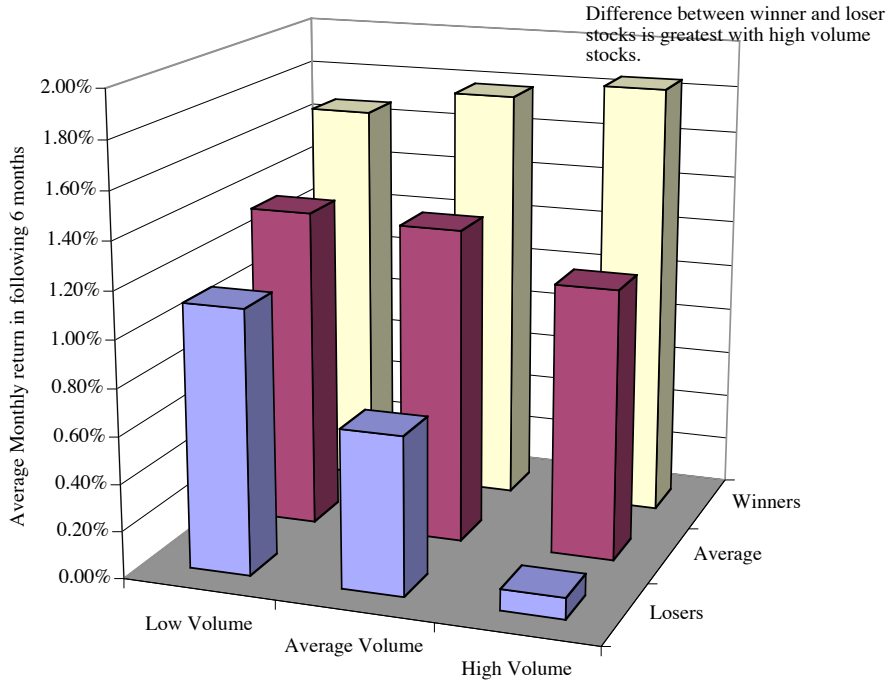
[12] Michaely, R, R.H. Thaler and K.L. Womack, 1995, *Price Reactions to Dividend Initiations and Omissions: Overreaction or Drift?* Journal of Finance, v50, 573-608.

[13] Datar, V., N. Naik and R. Radcliffe, 1998, *Liquidity and Asset Returns: An alternative test*, Journal of Financial Markets,

[14] Lee, C.M.C and B. Swaminathan, 1998, *Price Momentum and Trading Volume*, Working Paper, Social Science Research Network.

*Figure 12.5: Volume and Price Intreaction- NYSE and AMEX stocks - 1965-95*




Data from Lee and Swaminathan. The average monthly returns in the six months following the creation of the portfolios is reported.

Note that the price momentum effect is strongest for stocks with high trading volume. In other words, a price increase or decrease that is accompanied by strong volume is more likely to continue into the next period. This result has also been confirmed with shorter period returns – with daily returns, increases in stock prices that are accompanied by high trading volume are more likely to carry over into the next trading day.[15]

In summary, the level of trading volume in a stock, changes in volume and volume accompanied by price changes all seem to provide information that investors can use to pick stocks. It is not surprising that trading volume is an integral part of momentum investing.

**Momentum in Mutual Funds**

While there is little evidence that mutual funds that are ranked highly in one period continue to be ranked highly in the next, there is some evidence that has accumulated about

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[15] Stickel and Verecchia, 1994, *Evidence that trading volume sustains stock price changes*, Financial Analysts Journal, Nov-Dec, 57-67..

the very top ranked mutual funds. A number of studies[16] seem to indicate that mutual funds that earn above-average returns in one period will continue to earn above-average returns in the next period. Burt Malkiel, in his analysis of mutual fund performance over two decades, tests for this "hot hands" phenomenon by looking at the percentage of winners each year who repeat the next year in the 1970s and 1980s. His results are summarized in table 12.1 below:

*Table 12.1: Repeat Winners by year – 1971- 1990*

| *Year* | *Percent of repeat winners* | *Year* | *Percent of repeat winners* |
|---|---|---|---|
| 1971 | 64.80% | 1980 | 36.50% |
| 1972 | 50.00% | 1081 | 62.30% |
| 1973 | 62.60% | 1982 | 56.60% |
| 1974 | 52.10% | 1983 | 56.10% |
| 1975 | 74.40% | 1984 | 53.90% |
| 1976 | 68.40% | 1985 | 59.50% |
| 1977 | 70.80% | 1986 | 60.40% |
| 1978 | 69.70% | 1987 | 39.30% |
| 1979 | 71.80% | 1988 | 41.00% |
| 1971-79 | 65.10% | 1989 | 59.60% |
| | | 1990 | 49.40% |
| | | 1980-90 | 51.70% |

This table tells a surprising story. The percent of repeat winners clearly is much higher than dictated by chance (50%) in the 1970s. However, the percent of repeat winners during the 1980s looks close to random. Is this because mutual fund rankings became more ubiquitous during the 1980s? Maybe. It is also possible that what you are seeing are the effects of overall market performance. In the 1970s, when the equity markets had a string of negative years, mutual funds that held more cash consistently moved to the top of the rankings. You can also compare the returns you would have earned on a strategy of buying

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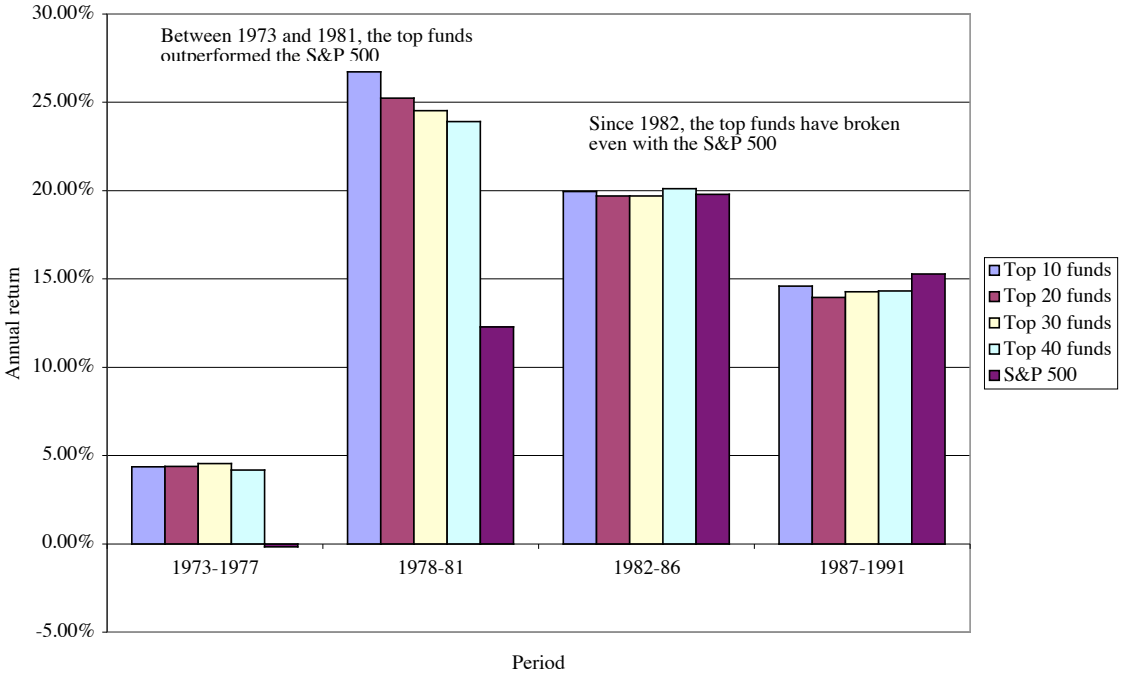
[16] See Grinblatt, M. and S.Titman, 1992, *The persistence of mutual fund performance*, Journal of Finance, v42, 1977-1984, Goetzmann, W.N. and R. Ibbotson, 1994, *Do winners repeat? Patterns in mutual fund performance*, Journal of Portfolio Management, v20, 9-18 and Hendricks, Patel and Zeckhauser, 1995, *Hot Hands in Mutual Funds: Short run persistence in performance*, 1974-1987, Journal of Finance, v48, 93-130.

the top funds (looking at the top 10, top 20, top 30 and top 40 funds) from each year and holding it for the next year. The returns are summarized in figure 12.6:

*Figure 12.6: Returns on top-ranked funds: 1973- 1991*




Data from Malkiel. The top funds are picked based upon performance over the prior year and the returns are computed over the following year.

Again, the contrast is striking. While the top funds outperformed the S&P 500 in 1973-77 and 1978-81 time periods, they matched the index from 1982 to 1986 and underperformed the index from 1987 to 1991.

In summary, there is little evidence, especially in recent years that investing in the mutual funds that were ranked highest last year in terms of performance will deliver above-average returns. In fact, these funds tend to increase their fees and costs and may be worse investments than some of the lower ranked funds.

## Crunching the Numbers

There are many measures of momentum and most of them are relative. In other words, a stock that goes up 30% during a period where all stocks increased substantially may not be viewed as having strong momentum, whereas a stock that goes up 5% in a bear market may qualify. You will begin by looking at how different measures of momentum vary across the market and then go about constructing a portfolio of momentum stocks.

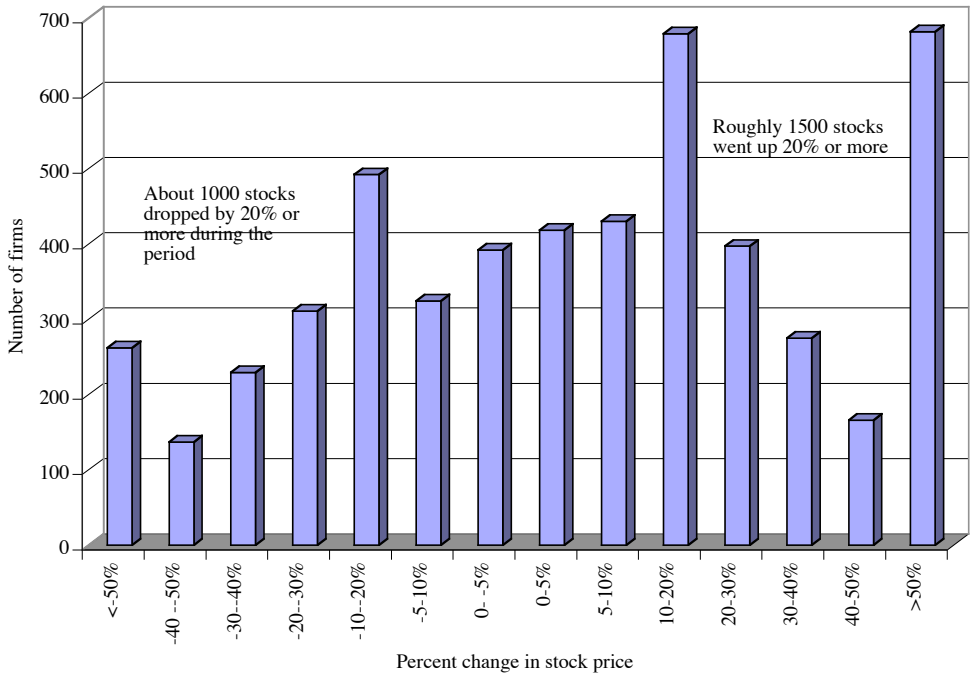
**Momentum Measures**

This section will examine differences across firms on three sets of momentum measures. The first set includes price momentum measures – price changes and relative price strength. The second set of measures look at trading volume and the final set look at earnings surprises.

***Price Momentum***

To get a measure of price momentum over a recent period, consider the returns from price appreciation that you would have made investing in individual stocks in the six-month period from October 2002 to March 2003. Figure 12.7 presents the distribution of stock returns (from price appreciation) over this period:

*Figure 12.7: Price Appreciation (%) from October 2002-March 2003*




Data from Value Line. This is the percentage price change over the period.

In this six-month period, the market was up approximately 13%, and more stocks went up than down. These price appreciation returns can be converted into measures of relative price strength for each stock by doing the following:

$$\text{Relative price strength} = \frac{(1 + \text{ Price Appreciation (\%) on stock over period})}{(1 + \text{ Price Appreciation (\%) on market over same time period})}$$

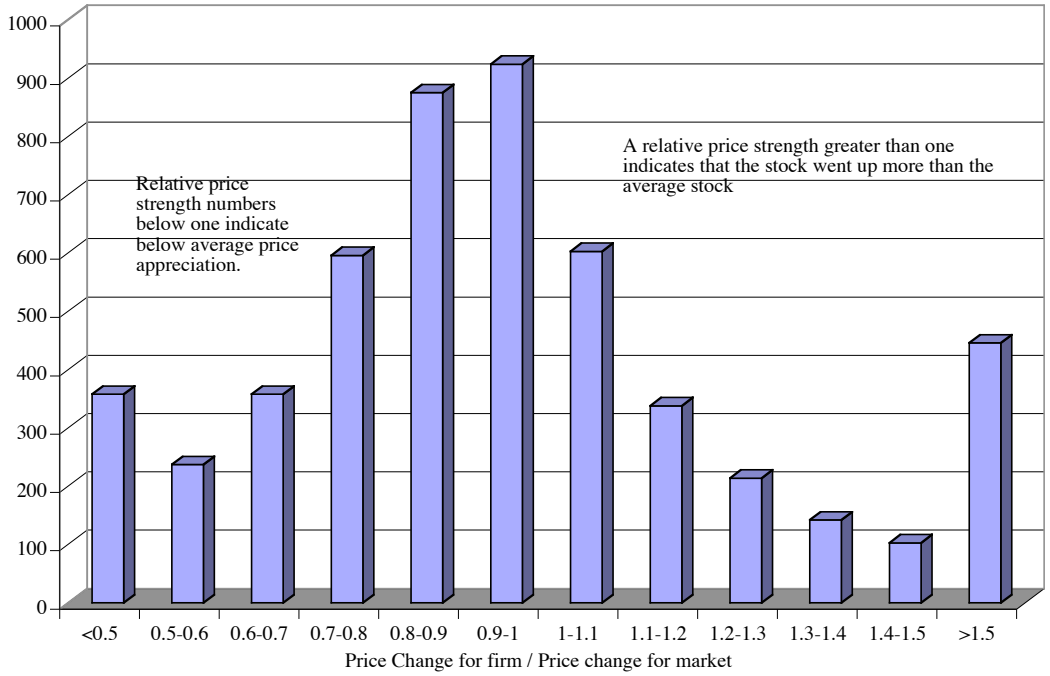
For example, the price appreciation on the market between October 2002 and March 2003 was 14.83%. The relative price strengths of Viacom which saw its price drop by –3.16% during the period and Staples which saw its price go up by 44.56% are computed below:

Relative Price strength$_{Viacom}$ = (1 -.0316)/(1.1483) = 0.84

Relative Price Strength$_{Staples}$ = (1.4456)/1.1483 = 1.26

Figure 12.8 summarizes the distribution of relative price strength across the market for the six-month period (Oct 2002- March 2003):

*Figure 12.8: Relative Price Strength - US firms from Oct 2002-March 2003*



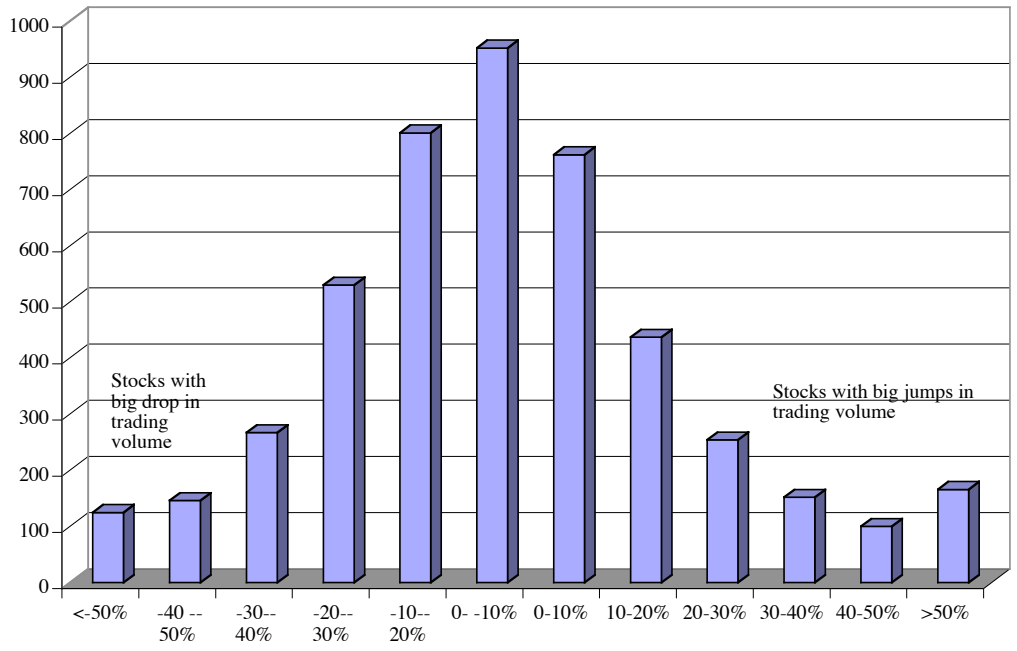

Data from Value Line. The relative strength measure is obtained by dividing the percentage price change for each stock by the percentage price change over the market.

While many firms have price changes that resemble the price change on the market (relative price strength close to 1), a larger number of firms have price changes that are very different from the market and it is these firms that make it into momentum portfolio. There are other measures of relative price strength used by investors, but they share common features. They all look at price increases over a period of time and scale them for overall market movements.

***Trading Volume***

If price momentum varies widely across companies, trading volume varies even more widely. Some stocks are extremely liquid and millions of shares are traded every day. Others hardly ever trade and volume momentum has to take into account the differences in the level of trading volume. You could, for instance, compare the average daily trading volume on a stock in a 6-month period with the average daily trading volume on the same stock in the prior six months for every stock in the market and compute a percentage change in volume. Figure 12.9 provides a summary of this distribution:

*Figure 12.9: Percent Change in Trading Volume: Six month periods*



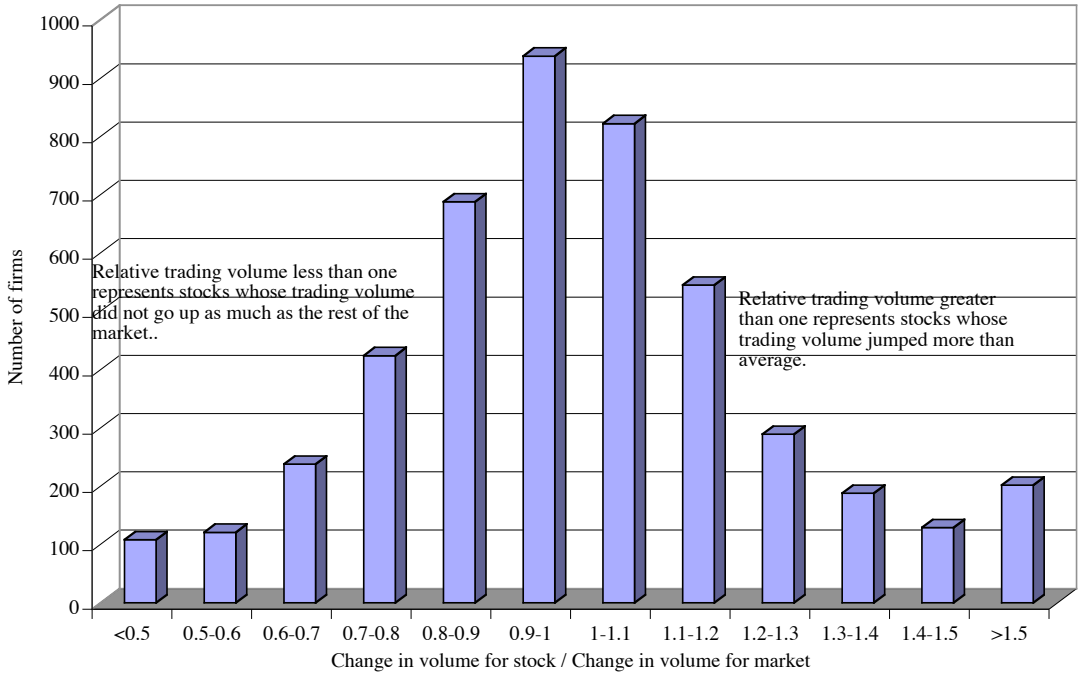

Data from Value Line. This is the percent change in trading volume from one six month period (April 2002-Sept 2002) to the next (Oct 2002-March 2002).

The trading volume from October 2002- March 2003 was compared with the volume from April –September 2002 for every firm. As with price momentum, the changes in trading volume can be scaled to changes in volume in the overall market to come up with a measure of relative volume momentum:

$$\text{Relative volume momentum} = \frac{(1 + \%\ \text{change in volume of trading in the stock})}{(1 + \%\ \text{change in volume for the market})}$$

Thus, a stock that registers a 50% trading volume increase in a market, where aggregate trading volume increases by 20% will have a relative volume momentum of 1.25 (1.5/1.2). Figure 12.10 presents the distribution of relative trading volume across the market:

*Figure 12.10: Relative Trading Volume - US Stocks: Oct 2002 - March 2003*




Data from Value Line. Relative trading volume is computed by dividing the percent change in trading volume for a stock by the average percent change for the market.

As with relative price strength, while many firms report increases in volume that are close to the increase in volume for the market, there are a substantial number of firms that report significantly higher or lower increases in trading volume than the market.

### *Earnings Surprises*

Earnings announcements, where firms report the actual earning per share over the prior period, contain important information not only about a firm's performance in that period but also about its expected performance in future periods. To measure how much information is contained in an earnings report, you should compare the earnings reported for a period to the earnings that were expected for the period. To get the latter, the firm has to be followed by analysts and the earnings estimates of these analysts for the firm have to be compiled. In the last two decades, services like I/B/E/S, Zacks and First Call have provided information on analyst forecasts to investors. In fact, the consensus estimates of

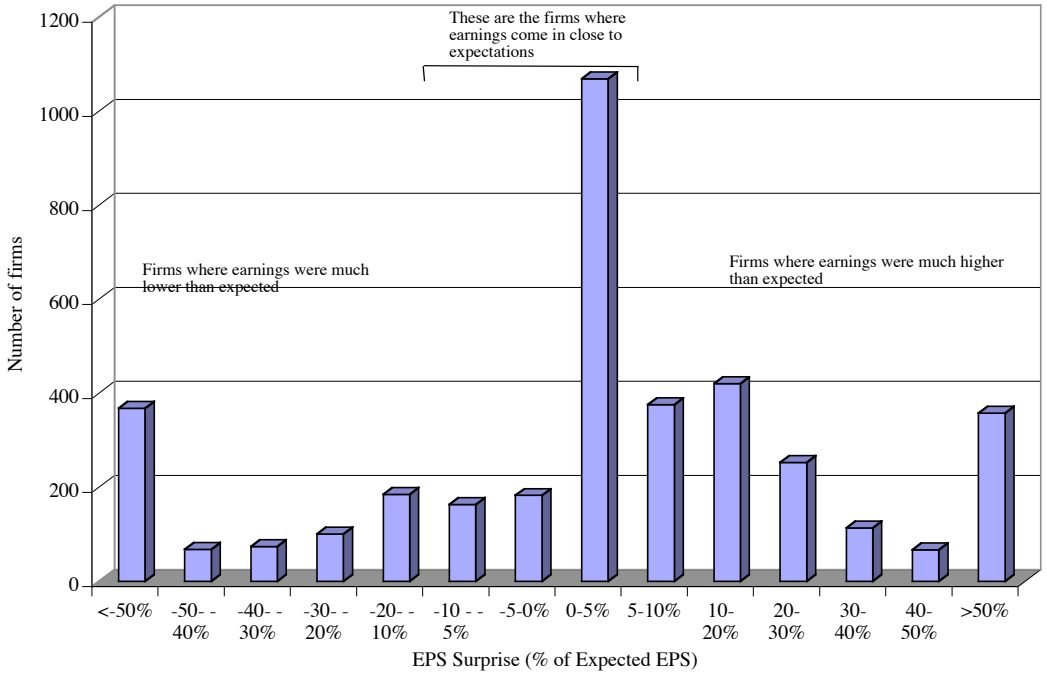
earnings per share for most firms are widely disseminated and discussed in the financial press.

Given the resources that analysts can bring to the task of estimating earnings and the access that analysts have to managers at firms, you would expect earnings forecasts to be fairly close to actual earnings for most firms and they are for most firms. There are some firms that manage to surprise markets with much higher or lower earnings than expected, and it is these earnings surprises that cause large stock price reactions. You can measure the magnitude of the surprise by looking at the dollar difference between actual and expected earnings per share, but this will bias you towards finding larger surprises at firms with larger earnings per share. A firm that is expected to have earnings per share of $ 2 is more likely to report larger surprises than a firm that is expected have earnings per share of $ 0.20. One way to scale the earnings surprise for the level of earnings is to compute it a percent of the expected earnings per share:

Earnings Surprise (%) = (Actual EPS – Expected EPS)/ Expected EPS

Note that this measure of earnings surprise has its own limitations. One is that it becomes difficult to measure earnings surprises for firms that are expected to lose money (negative expected earnings per share) or for firms where the expected earnings per share close to zero. Notwithstanding this problem, the distribution of earnings surprises (in % terms) in the first quarter of 2003 is reported in Figure 12.11:

*Figure 12.11: EPS Surprises in US Market - First Quarter 2003*




Data from Zacks. The earnings surprise is the difference between the actual earnings and the forecasted earnings per share, divided by the expected earnings per share.

The sample was restricted only to firms that were expected to have positive earnings per share and that had analyst coverage. As a consequence, smaller, less liquid and younger companies (that are more likely to have negative earnings and be not followed by analysts) are eliminated from your sample. Even with this sample of larger and more liquid firms, there are a couple of interesting findings that emerge:

- Most earnings surprises are small, with actual earnings falling within 10% of expected earnings.
- There are some firms that report larger earnings surprises, but among these firms, positive surprises are much more common than negative surprises. Firms that are doing badly clearly find ways to get the news out to analysts and lower expectations before the earnings are actually reported.

**Constructing a Momentum Portfolio**

You can construct two different kinds of momentum portfolios. One portfolio will include stocks with price and volume momentum, using the momentum measures constructed in the last section. The other portfolio will be composed of stocks that have had

large positive earnings surprises. In this section, you will construct both portfolios with the intent of putting them under the microscope for potential problems

***Price/Volume Momentum***

If you accept the proposition that price momentum carries over into future prices, especially if accompanied by increasing trading volume, you can construct a portfolio of stocks that have both characteristics. In constructing this portfolio in April 2003, price and volume momentum measures were estimated over the six-month period beginning in October 2002 and ending in March 2003. The portfolio is composed of stocks that were in the top 10% of the market in both price and volume momentum measure. Roughly speaking, this is accomplished by choosing firms that score more than 1.50 on the relative price strength and relative volume measures. Table 12.2 lists these stocks:

*Table 12.2: Stocks with Price and Volume Momentum*

| *Company Name* | *Return over last 26 weeks* | *Relative strength - 6 month* | *Percent change in volume* | *Relative Trading volume* |
|---|---|---|---|---|
| Aceto Corp. | 123.59% | 1.95 | 68.55% | 1.74 |
| Allen Telecom | 107.00% | 1.80 | 68.63% | 1.74 |
| Alpha Pro Tech Ltd | 82.93% | 1.59 | 46.97% | 1.52 |
| Ask Jeeves Inc | 707.07% | 7.03 | 68.00% | 1.74 |
| Avid Technology | 143.75% | 2.12 | 71.84% | 1.78 |
| Boots & Coots Intl Well Cntrl | 711.11% | 7.06 | 104.35% | 2.11 |
| Captiva Software Corp | 235.56% | 2.92 | 62.02% | 1.68 |
| Castelle | 474.07% | 5.00 | 60.11% | 1.66 |
| CNB Finl Corp | 74.86% | 1.52 | 47.55% | 1.53 |
| Concur Technologies Inc. | 201.70% | 2.63 | 46.55% | 1.52 |
| Document Sciences Corp | 163.06% | 2.29 | 60.88% | 1.66 |
| DOR BioPharma Inc | 271.43% | 3.23 | 55.72% | 1.61 |
| Double Eagle Pet & Min | 90.27% | 1.66 | 56.69% | 1.62 |
| E-LOAN Inc. | 82.64% | 1.59 | 50.80% | 1.56 |
| Evolving Sys Inc | 927.59% | 8.95 | 52.72% | 1.58 |
| FindWhat.com Inc | 151.51% | 2.19 | 54.78% | 1.60 |
| First Colonial Group | 84.71% | 1.61 | 62.01% | 1.68 |
| Flamel Technologies S.A. | 181.01% | 2.45 | 65.01% | 1.71 |
| Forward Inds Inc | 133.33% | 2.03 | 66.81% | 1.73 |
| Garmin Ltd. | 93.03% | 1.68 | 59.95% | 1.66 |
| GRIC Communications Inc | 87.04% | 1.63 | 70.33% | 1.76 |
| Group 1 Software | 170.00% | 2.35 | 64.64% | 1.70 |
| Hi-Tech Pharm. | 201.74% | 2.63 | 80.00% | 1.86 |
| ID Biomedical Corp | 97.83% | 1.72 | 69.79% | 1.76 |
| IEC Electrs Corp. | 350.00% | 3.92 | 86.66% | 1.93 |

| | | | | |
|---|---|---|---|---|
| ImageX.com Inc | 131.82% | 2.02 | 46.97% | 1.52 |
| ImagicTV Inc | 160.00% | 2.26 | 47.00% | 1.52 |
| InterDigital Commun | 95.94% | 1.71 | 48.41% | 1.54 |
| KVH Inds Inc | 113.90% | 1.86 | 47.71% | 1.53 |
| Metrologic Instruments Inc | 142.77% | 2.11 | 52.63% | 1.58 |
| Metropolitan Finl | 74.07% | 1.52 | 61.57% | 1.67 |
| Movie Star Inc. | 127.27% | 1.98 | 45.77% | 1.51 |
| Netease.com Inc ADS | 382.13% | 4.20 | 83.73% | 1.90 |
| Network Equip. Tech. | 85.10% | 1.61 | 65.23% | 1.71 |
| North Coast Energy Inc. | 73.75% | 1.51 | 62.04% | 1.68 |
| Old Dominion Freight | 75.32% | 1.53 | 93.85% | 2.01 |
| Pacific Internet Limited | 183.82% | 2.47 | 85.74% | 1.92 |
| Packeteer Inc | 199.11% | 2.60 | 57.81% | 1.63 |
| Pan Am Beverages 'A' | 135.17% | 2.05 | 53.53% | 1.59 |
| Perceptron Inc. | 106.67% | 1.80 | 44.78% | 1.50 |
| Premier Bancorp Inc | 98.38% | 1.73 | 52.29% | 1.58 |
| ProBusiness Services | 101.35% | 1.75 | 53.48% | 1.59 |
| Pumatech Inc. | 825.00% | 8.05 | 56.78% | 1.62 |
| Rambus Inc. | 222.35% | 2.81 | 50.76% | 1.56 |
| Sanfilippo John B. | 115.00% | 1.87 | 61.72% | 1.67 |
| Sohu.com Inc | 514.59% | 5.35 | 62.07% | 1.68 |
| Stratasys Inc | 204.74% | 2.65 | 48.10% | 1.53 |
| Transcend Services Inc. | 129.59% | 2.00 | 51.50% | 1.57 |
| United Security Bancshares Inc | 82.76% | 1.59 | 72.60% | 1.79 |
| US SEARCH.com | 87.34% | 1.63 | 55.27% | 1.61 |
| Vital Images Inc | 140.39% | 2.09 | 57.25% | 1.63 |
| Whitman ED Group | 146.02% | 2.14 | 76.02% | 1.82 |
| Xybernaut Corp | 80.95% | 1.58 | 46.00% | 1.51 |

The 54 stocks represent a wide cross section of industries. This price/volume momentum portfolio would have been very different if you used a different time period (three months versus six months, for instance). Thus, you can expect to see variations even among momentum investors on what they hold in their portfolios.

***Information Momentum***

While there are a variety of information announcements that you can build a portfolio around, earnings announcements stand out because all U.S. firms make them four times a year and the announcements receive considerable media attention. In contrast, relatively few firms make stock split and acquisition announcements. Using the definition of earnings surprise developed in the last section (as a percent of the expected earnings per share), you can construct a portfolio of stocks with the largest recent earnings surprises.

The problem, though, is that this will bias you towards a portfolio of stocks with very small earnings. To prevent this from occurring, two criteria were used in constructing this portfolio. The first is that the actual earnings per share had to exceed $0.25; this eliminates firms with very low earnings per share. The second is that the earnings surprise has to exceed 50%; the actual earnings per share have to be more than 50% higher than the predicted earnings per share. The resulting portfolio of 105 firms is presented in table 12.3.

*Table 12.3: Firms with EPS>$0.25 and Earnings Surprises >50%*

| Company | Stock Price | Actual EPS | Expected EPS | EPS Surprise | Company | Stock Price | Actual EPS | Expected EPS | EPS Surprise |
|---|---|---|---|---|---|---|---|---|---|
| ELECTR ARTS INC | $57.56 | $1.79 | $0.33 | 442.42% | GOODRICH CORP | $14.17 | $0.66 | $0.35 | 88.57% |
| MOBILE MINI INC | $15.24 | $0.41 | $0.29 | 41.38% | LOCKHEED MARTIN | $44.75 | $0.85 | $0.42 | 102.38% |
| ADVANTA CO CL B | $8.00 | $0.43 | $0.29 | 48.28% | BLACK & DECKER | $36.20 | $1.05 | $0.43 | 144.19% |
| ARTESIAN RES | $30.48 | $0.45 | $0.30 | 50.00% | SEARS ROEBUCK & | $26.55 | $2.11 | $0.56 | 276.79% |
| COACH INC | $38.97 | $0.68 | $0.29 | 134.48% | OLD DOMINION FL | $33.38 | $0.57 | $0.40 | 42.50% |
| COLUMBIA SPORTS | $38.00 | $0.72 | $0.26 | 176.92% | ENGELHARD CORP | $22.45 | $0.44 | $0.30 | 46.67% |
| KELLWOOD | $28.45 | $0.38 | $0.26 | 46.15% | MARRIOTT INTL-A | $33.01 | $0.55 | $0.36 | 52.78% |
| TORO CO | $71.60 | $0.38 | $0.26 | 46.15% | FOSSIL INC | $17.68 | $0.48 | $0.29 | 65.52% |
| LEE ENTRPRS | $32.83 | $0.51 | $0.34 | 50.00% | UNION PAC CORP | $57.50 | $1.10 | $0.60 | 83.33% |
| METTLER-TOLEDO | $32.70 | $0.69 | $0.37 | 86.49% | RADIOSHACK CORP | $23.20 | $0.59 | $0.32 | 84.38% |
| AVON PRODS INC | $57.57 | $0.80 | $0.41 | 95.12% | INGERSOLL RAND | $40.30 | $1.19 | $0.61 | 95.08% |
| EDUCATION MGMT | $41.91 | $0.70 | $0.50 | 40.00% | WASHINGTON POST | $705.89 | $9.83 | $3.71 | 164.96% |
| SHAW GROUP INC | $9.70 | $0.42 | $0.30 | 40.00% | ENERGIZER HLDGS | $26.37 | $0.91 | $0.33 | 175.76% |
| LANDSTAR SYSTEM | $61.22 | $0.88 | $0.61 | 44.26% | HONEYWELL INTL | $22.00 | $0.50 | $0.33 | 51.52% |
| ANSYS INC | $25.13 | $0.43 | $0.29 | 48.28% | ESTEE LAUDER | $29.30 | $0.44 | $0.28 | 57.14% |
| SUNRISE ASSIST | $24.95 | $0.83 | $0.55 | 50.91% | AMERISTAR CASIN | $12.57 | $0.62 | $0.36 | 72.22% |
| ODYSSEY HLTHCR | $23.58 | $0.42 | $0.27 | 55.56% | COORS ADOLPH B | $48.24 | $0.63 | $0.30 | 110.00% |
| CHICAGO MERC EX | $47.12 | $1.02 | $0.63 | 61.90% | SAFEWAY INC | $19.90 | $0.80 | $0.53 | 50.94% |
| HARLAND(JOHN H) | $23.83 | $0.66 | $0.40 | 65.00% | CAPITOL FEDL FN | $30.43 | $0.38 | $0.25 | 52.00% |
| CERTEGY INC | $25.02 | $0.46 | $0.26 | 76.92% | BAXTER INTL | $19.26 | $0.59 | $0.37 | 59.46% |
| CAREER EDU CORP | $50.71 | $0.65 | $0.35 | 85.71% | SBC COMMUN INC | $21.05 | $0.62 | $0.35 | 77.14% |
| DIEBOLD | $36.14 | $0.67 | $0.36 | 86.11% | MDU RESOURCES | $28.00 | $0.63 | $0.26 | 142.31% |
| BAUSCH & LOMB | $34.45 | $0.60 | $0.31 | 93.55% | ROADWAY CORP | $36.03 | $1.48 | $0.35 | 322.86% |
| MERITAGE CORP | $36.30 | $1.72 | $0.88 | 95.45% | GARMIN LTD | $35.16 | $0.42 | $0.30 | 40.00% |
| FIRSTENERGY CP | $31.04 | $1.19 | $0.47 | 153.19% | STARTEK INC | $24.35 | $0.45 | $0.29 | 55.17% |
| RAYTHEON CO | $27.98 | $0.64 | $0.25 | 156.00% | ELECTR DATA SYS | $16.27 | $0.51 | $0.32 | 59.38% |
| POLARIS INDUS | $49.82 | $1.51 | $0.54 | 179.63% | HON INDS | $28.80 | $0.48 | $0.28 | 71.43% |
| WCI COMMUNITIES | $10.88 | $0.99 | $0.25 | 296.00% | UTD DEFENSE IND | $21.80 | $0.82 | $0.47 | 74.47% |
| FLIR SYSTEMS | $47.21 | $0.71 | $0.50 | 42.00% | STANDARD PAC | $27.95 | $1.58 | $0.64 | 146.88% |
| INVACARE CORP | $32.42 | $0.56 | $0.39 | 43.59% | BEAR STEARNS | $67.48 | $2.00 | $1.33 | 50.38% |
| VIACOM INC CL B | $40.40 | $0.36 | $0.25 | 44.00% | CEMEX SA ADR | $18.48 | $0.54 | $0.28 | 92.86% |
| YUM! BRANDS INC | $24.73 | $0.55 | $0.38 | 44.74% | LEAR CORP | $38.45 | $1.76 | $0.99 | 77.78% |
| OMNICOM GRP | $59.27 | $1.08 | $0.71 | 52.11% | G&K SVCS A | $24.69 | $0.48 | $0.32 | 50.00% |
| MCCLATCHY CO-A | $52.80 | $0.86 | $0.56 | 53.57% | RYDER SYS | $20.38 | $0.58 | $0.31 | 87.10% |
| BIOVAIL CORP | $40.10 | $0.60 | $0.38 | 57.89% | STEEL DYNAMICS | $11.90 | $0.65 | $0.34 | 91.18% |
| L-3 COMM HLDGS | $36.48 | $0.79 | $0.47 | 68.09% | SEAGATE TECH | $10.83 | $0.43 | $0.27 | 59.26% |
| INTL BUS MACH | $79.01 | $1.34 | $0.79 | 69.62% | OCULAR SCIENCES | $14.26 | $0.48 | $0.28 | 71.43% |
| COASTAL BANCORP | $31.80 | $1.05 | $0.61 | 72.13% | TEXTRON INC | $28.62 | $1.04 | $0.51 | 103.92% |
| KNIGHT RIDDER | $59.65 | $1.16 | $0.64 | 81.25% | CORRECTIONS CRP | $19.40 | $1.14 | $0.48 | 137.50% |
| NEWELL RUBBERMD | $29.93 | $0.49 | $0.27 | 81.48% | NORTHROP GRUMMN | $81.38 | $1.73 | $0.62 | 179.03% |
| SPX CORP | $31.31 | $1.37 | $0.54 | 153.70% | ARKANSAS BEST | $26.58 | $0.57 | $0.33 | 72.73% |
| GANNETT INC | $72.28 | $1.29 | $0.92 | 40.22% | MOHAWK INDS INC | $51.32 | $1.25 | $0.61 | 104.92% |
| TRIBUNE CO | $46.85 | $0.57 | $0.38 | 50.00% | ALLIANT ENGY CP | $16.77 | $0.62 | $0.34 | 82.35% |
| NY TIMES A | $44.22 | $0.69 | $0.42 | 64.29% | INVISION TECH | $22.04 | $2.40 | $1.62 | 48.15% |
| RYLAND GRP INC | $48.00 | $2.50 | $1.24 | 101.61% | TIMBERLAND CO A | $43.48 | $0.73 | $0.33 | 121.21% |
| BECKMAN COULTER | $34.57 | $0.90 | $0.43 | 109.30% | HOOKER FURNITUR | $27.00 | $0.88 | $0.55 | 60.00% |
| PULTE HOMES INC | $53.96 | $2.78 | $1.22 | 127.87% | LANDAMERICA FIN | $41.94 | $3.42 | $2.27 | 50.66% |
| BUNGE LTD | $27.30 | $0.98 | $0.33 | 196.97% | HAVERTY FURNIT | $11.35 | $0.36 | $0.25 | 44.00% |
| WATERS CORP | $20.70 | $0.41 | $0.29 | 41.38% | PACCAR INC | $53.67 | $1.05 | $0.61 | 72.13% |
| SELECT INS GRP | $24.67 | $0.41 | $0.28 | 46.43% | CARMIKE CINEMA | $20.94 | $0.89 | $0.25 | 256.00% |
| VIACOM INC CL A | $40.47 | $0.37 | $0.25 | 48.00% | NAUTILUS GROUP | $10.91 | $0.69 | $0.44 | 56.82% |
| AMERICA SVC GRP | $12.75 | $0.46 | $0.28 | 64.29% | NUCOR CORP | $38.91 | $0.50 | $0.25 | 100.00% |
| BOEING CO | $27.09 | $0.71 | $0.42 | 69.05% | | | | | |

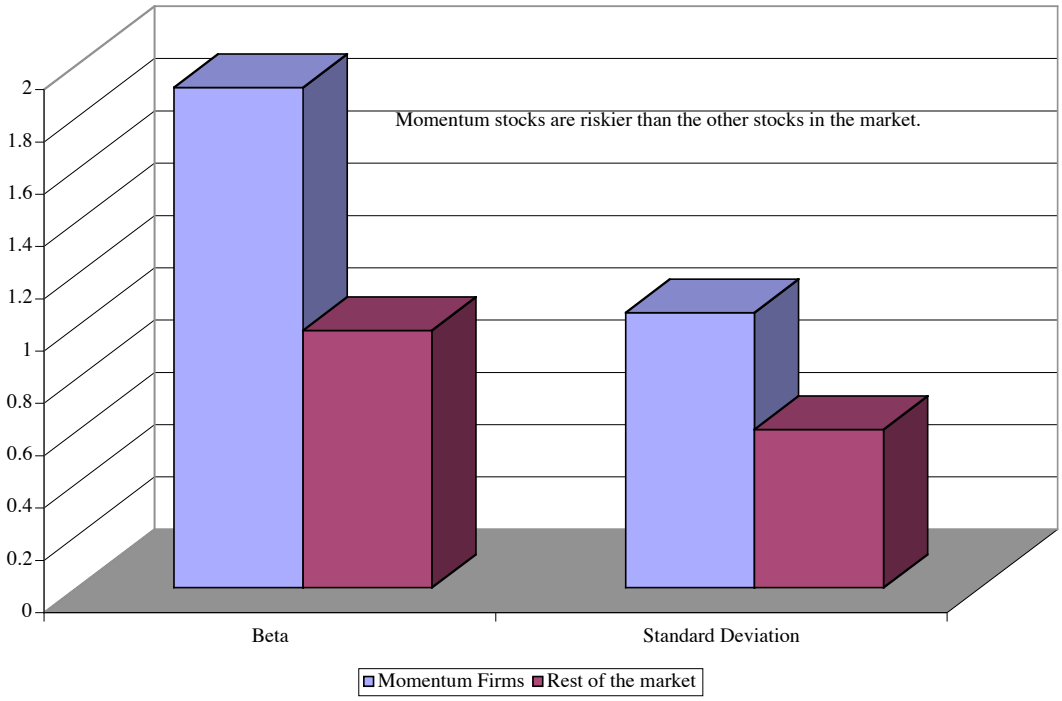
## The Rest of the Story

In the last section, portfolios of stocks with price/volume momentum and stocks with large positive earnings surprises were constructed. With the former, you buy the stocks hoping that the price momentum will continue into the future. With the latter, your returns are dependent upon stocks continue to drift up after large positive earnings announcements. In this section, you will look at the weaknesses with each strategy and possible ways of reducing exposure to these weaknesses.

### Risk

When constructing the two portfolios in the last section, no attention was paid to the riskiness of the stocks that went into the portfolios. To the extent that riskier stocks are more likely to show price and volume momentum, you may find your eventual portfolio to be far riskier than the market. Figure 12.12 looks at risk on two dimensions – beta and standard deviation in stock prices – and compares the firms in the high price/volume momentum portfolio with the rest of the market.

*Figure 12.12: Risk Comparison: Momentum Stocks versus Rest of the Market*

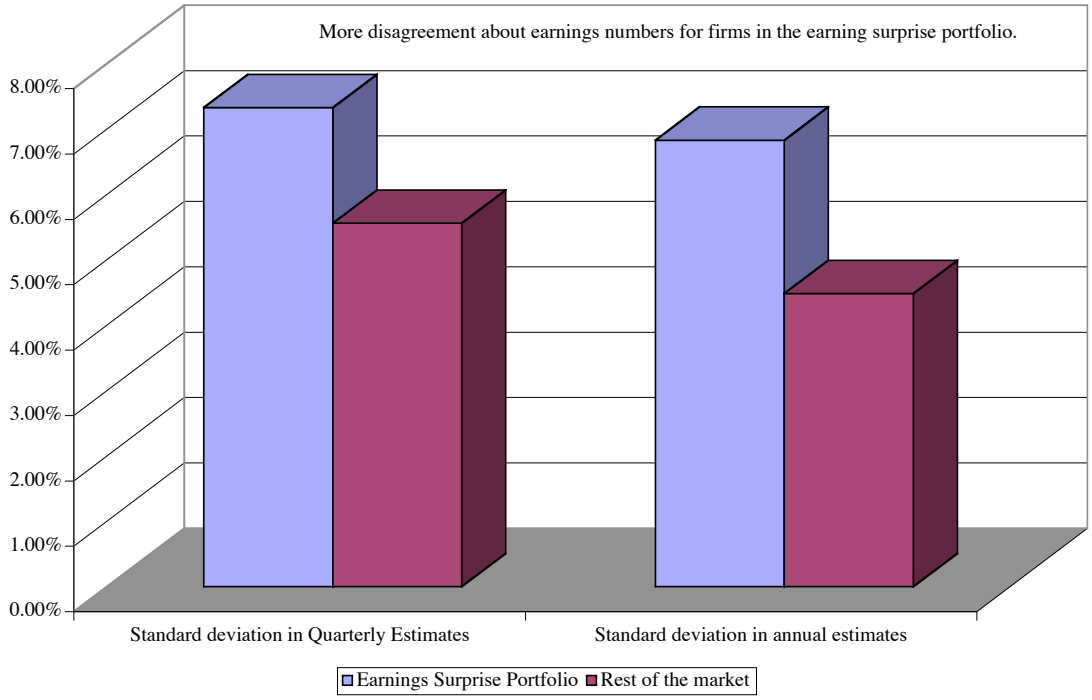



Data from Value Line. The beta and standard deviation is computed using 3 years of data for all stocks.

The difference in risk levels is striking. The momentum stocks have an average beta almost twice that of the rest of the market (1.91 versus 0.98) and are much more volatile (standard deviation of 100% versus the market average of 60%) than the market. A momentum portfolio thus has to beat the market by a hefty margin to justify the additional risk. Putting a cap of 1.20 on the beta and 80% on the standard deviation reduces the portfolio listed in Table 12.2 from 54 firms to 15 firms.

With the earnings surprise portfolio, the risk can lie in the estimate of expected earnings. Note that the consensus estimate of earnings per share that was used as the predicted earnings per share represents an average across estimates made by different analysts following the company. There can be disagreement among analysts that is not reflected in the consensus estimate and the uncertainty that may be generated by this disagreement will have to be factored into the investment strategy. To illustrate, assume that you have two firms that have just reported actual earnings per share of $ 2 and that the predicted earnings per share for both firms was $ 1.50. However, assume that there was relatively little disagreement about the predicted earnings per share among analysts following the first firm but a great deal among analysts following the second. A legitimate argument can be made that the earnings surprise for the first firm (with little disagreement among analysts) contains more good news than the earnings surprise for the second (where there is disagreement). Following up, you would be far more likely to invest in the first firm. Figure 12.13 compares the standard deviation in earnings estimates across analysts for companies in the high earnings surprise portfolio with the standard deviation in earnings estimates for companies in the rest of the market; the standard deviation in EPS estimates are divided by the consensus estimate for comparability.

*Figure 12.13: Disagreement among Analysts - Surprise Portfolio versus Market*




Data from Zacks. The standard deviation is computed across estimates of earnings per share across analysts following each stock.

There is clearly more disagreement among analysts regarding earnings estimates for firms in the earnings surprise portfolio than in the rest of the market.

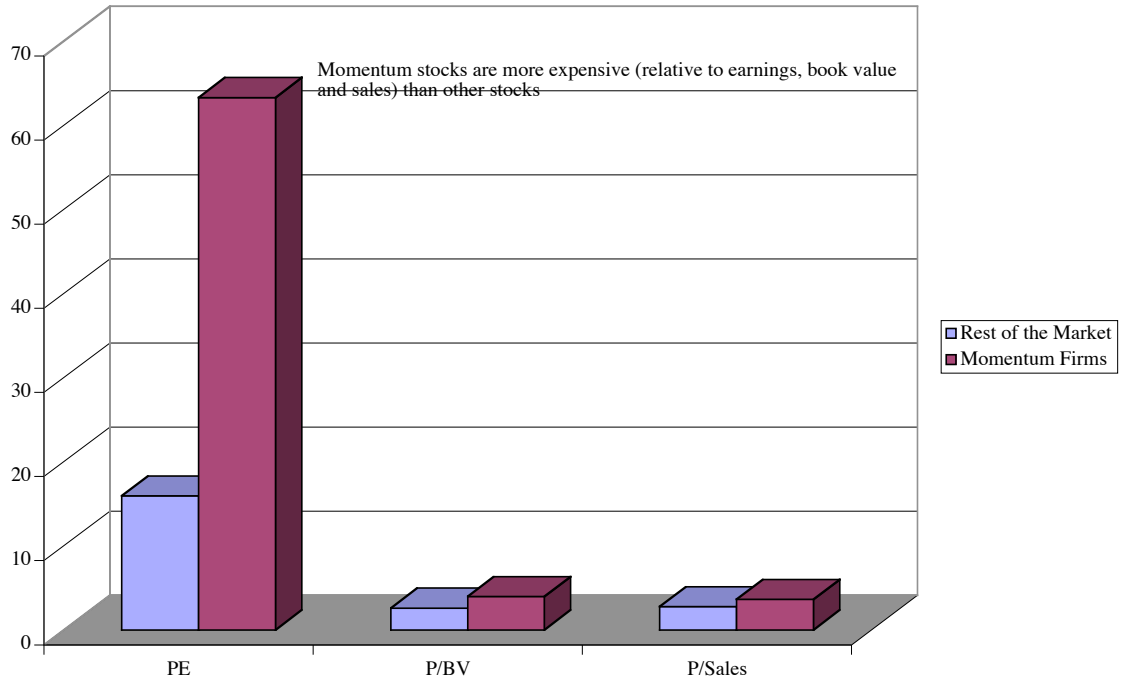
**Momentum Shifts (When do you sell?)**

One of the perils of a momentum-based strategy is that the momentum that is your friend for the moment can very quickly become your foe. As you saw in the empirical tests of these strategies, your returns are very sensitive to how long you hold the stock. Holding a stock too short or too long a period can both work against you and telling when momentum is shifting is one of the most difficult tasks in investing.

There are signs that, while not infallible, provide early warning of shifting momentum. One is insider buying and selling; insiders often are among the first to sell a stock when momentum carries the price too high. Unfortunately, the information on insider buying and selling comes to you several weeks after the trades are made and in some cases, the warning comes too late. Another is standard valuation metrics such as price earnings ratios. Investing in momentum stocks that trade at unsustainable multiples of earnings is clearly a more dangerous strategy than investing in stocks that trade at reasonable values. In

Figure 12.14, the average price earnings, price to book and price to sales ratios are reported for firms in the momentum portfolio and the rest of the market.

*Figure 12.14: Valuation Metrics - Momentum firms vs Market*




Data from Value Line from April 2003. The price earnings is the current price divided by the earnings per share.

On every measure, the momentum portfolio is more highly priced than the rest of the market. To illustrate, the stocks in the momentum portfolio have an average PE ratio of 63, whereas the rest of the market has an average PE ratio of 16. With price to book ratios, the average for the momentum portfolio is 4, whereas the average for the rest of the market is about 2.6. Thus, a momentum portfolio may include a large number of overpriced stocks. Applying a cap of 20 on PE ratios, for instance, reduces the number of the firms in the momentum portfolio from 53 firms to 10 firms.

With the earnings surprise portfolio, the key question that you need to address is whether the positive earnings surprises are created by temporary items (one time earnings, currency gains) or by improved performance; the latter is much better news. Your need to invest right after an earnings announcement will clash with your desire to examine the details of the earnings announcement, but the payoff to waiting may be substantial. Alternatively, you can use other screens that find stocks where the earnings surprises and price momentum are likely to be sustained. One is to consider earnings surprises in previous quarters, arguing that firms that deliver actual earnings that beat expectations

several quarters in a row have more sustainable improvement in earnings than other firms. Considering these statistics for the 105 firms with the most positive earnings surprises in Table 12.3, you find that 25 of these firms also had positive earnings surprises in the previous quarter as well.

**Execution Costs**

By their very nature, momentum and information based investment strategies require frequent trading and will generate large transactions costs. The transactions costs include not just the commissions but also the price impact that you can have as you trade. Obviously, this price impact will be minimal if you are an individual investor but even small trades can affect prices when you are trading illiquid stocks.

With earnings surprise strategies, timing can make the difference between success and failure. If you are able to place a trade immediately after an earnings announcement, you will be able to gain a much bigger gain from the price run-up. Unfortunately, the earnings announcement will trigger a wave of buying and individual investors may be at a disadvantage relative to institutional investors when it comes to execution speed. There are options available to individual investors who want to trade more efficiently, but they will be expensive.

## Lessons for Investors

If you decide to pursue a price/volume momentum strategy, you have to be a short-term investor and be willing to trade frequently. While the strategy will always be risky, there are ways in which you can reduce your exposure to its limitations. In general, you should consider doing the following:

- *Have a clear strategy based upon empirical analysis:* Ultimately, the question of whether momentum carries over into future price changes is an empirical question. While the past is not necessarily prologue, there is evidence of stock price momentum but it is very sensitive to time horizon. Investors therefore have to put their momentum strategies to the test on past data, using specific time horizons to maximize their chances of earning returns.
- *Develop screens to eliminate "troublesome" stocks:* Momentum stocks tend to be riskier than the rest of the market and often trade at high prices, relative to fundamentals. Since there is a good chance of momentum reversing itself with these highly priced stocks, you should eliminate the riskiest, most overpriced stocks from your portfolio.

- *Execute:* Trading costs can very quickly overwhelm any additional returns from a momentum strategy and these costs can be exaggerated by the need to trade quickly to take advantage of momentum. Keeping trading costs under control is key to success with this strategy.
- *Be disciplined:* To earn your promised returns, you have to stay true to your tested strategy. All too often, investors deviate from their strategies when confronted with failure.

Incorporating these factors, a portfolio of momentum stocks was created using the following screens:

- Price and volume momentum > 1.40; these screens are not as strict as the screens used in the last section, but will allow you to screen for high risk and over priced stocks.
- Risk criteria: Beta < 1.20 and Standard deviation in stock prices < 80%; These screens will eliminate the riskiest stocks in the portfolio. The levels used for the screen represent the 75$^{th}$ percentile of all US stocks, thus ensuring that the stocks in top quartile in terms of risk will be eliminated from the portfolio.
- Pricing Screens: Only stocks with PE ratios less than 20 are included in the final portfolio.

The resulting portfolio of seven stocks is listed in appendix A.

If you choose to adopt an earnings surprise or information based investment strategy, where you plan to buy after good news and sell after bad, your time horizon will be measured in hours rather than weeks. If you want to maximize your returns from this strategy, you should try to:

- *Invest in information and execution:* Since stock prices react to information, you will need to have access to information immediately. Investing in an information system that delivers news to you in time to trade is a necessary prerequisite for the strategy to work.
- *Develop rules that can be used to screen stocks with minimal information:* Investors who use this strategy often have to trade on incomplete information. For instance, you may have to buy stock after a positive earnings report without having access to the details of the earnings reports. Rules that you can use to screen earnings reports for potential problems may help protect against downside risk. For instance, a positive earnings report from a company with a history of earnings revisions and shady accounting practices may be viewed with more skepticism than a report from a more company with a better reputation.

- *Constantly track your investment to decide on the optimal holding period:* The momentum from news announcements seems to peak at some point in time and then reverse itself. You will either have to develop an optimal holding period, based upon looking at past history, and stay consistent, or use technical rules (such as a drop in trading volume) that allow you to detect when the momentum shifts.
- *Factor in transactions costs and tax liabilities:* Trading on news is expensive. Not only will you have to trade often but you may also have to pay more for speedy execution. These costs can accumulate over the course of time and eliminate any profits from the strategy.

Factoring these concerns, the following screens were used to come up with an earnings surprise portfolio:

- *Expected EPS in most recent quarter>$0.25*: This eliminates firms with miniscule earnings that are likely to report large earnings surprises. A side benefit is that will also eliminate firms with shares that trade at very low prices and have high transactions costs.
- *EPS Surprise > 40%*: The earnings surprise, defined as the difference between actual and predicted earnings per share in the most recent quarter, divided by the predicted earnings per share, has to be larger than 40%. In other words, the actual earnings have to be at least 40% above expectations.
- *Standard deviation in analyst forecasts < 5%*: Since earnings surprises should have more impact when there is agreement among analysts about the predicted earnings per share, firms are eliminated from the portfolio when there was significant disagreement among analysts about predicted earnings.
- *EPS Surprise previous period > 0*: Firms that reported a positive earnings surprise in the previous quarter are considered as have more sustainable earnings increases than firms that reported earnings that were less than anticipated in the last quarter.
- *Low PE ratio*: Studies indicate that prices are more likely to drift after value companies report earnings surprises. Pursuant to this finding, only companies that trade at PE ratios less than 20 were considered for the portfolio.

The resulting portfolio of 29 stocks is summarized in appendix 2.

## Conclusion

Momentum based strategies appeal to investors because it seems intuitive that stocks that have gone up in the past will continue to go up in the future. There is evidence of price momentum in financial markets but with a caveat. Stock prices that have gone up in the past – winner stocks – are likely to continue to go up in the near future. The momentum,

however, reverses itself after a few months and stock price reversals are more likely if you hold for longer time periods. With information announcements such as earnings reports and stock splits, the evidence is similarly ambiguous. When firms report good news, stock prices jump on the announcement and continue to go up after the announcement but only for a few days. As with price momentum, there is a point at which price momentum seems to stall and prices reverse themselves. In both cases, the empirical evidence suggests that price momentum is more likely to be sustained if it is accompanied by an increase in trading volume.

There are two classes of momentum strategies that you can construct. In the first, you buy stocks with both price and volume momentum, i.e., stocks that have gone up more than other stocks in the market over a prior period with an accompanying increase in trading volume. These stocks tend to be riskier than other stocks in the market and your odds of success improve if you can screen these stocks to eliminate over priced stocks where insiders are selling. In the second, you buy stocks after positive earnings surprises, hoping to gain as the stock prices increase. Here again, you can improve your odds of success if you can separate the firms that have sustainable earnings increases from the firms that do not.

*Appendix 1: Stocks with price and volume momentum, low risk and low PE*

| *Company* | *Return over 6 months* | *Relative Price strength* | *Relative volume* | *PE Ratio* | *Beta* | *Standard deviation* |
|---|---|---|---|---|---|---|
| Chronimed Inc. | 68.35% | 1.47 | 1.46 | 18.76 | 0.76 | 79.83% |
| Movie Star Inc. | 127.27% | 1.98 | 1.51 | 20.40 | 1.11 | 70.26% |
| Aceto Corp. | 123.59% | 1.95 | 1.74 | 17.06 | 0.74 | 52.04% |
| North Coast Energy Inc. | 73.75% | 1.51 | 1.68 | 8.52 | 0.56 | 46.32% |
| Sanfilippo John B. | 115.00% | 1.87 | 1.67 | 11.87 | 0.71 | 44.28% |
| First Colonial Group | 84.71% | 1.61 | 1.68 | 23.89 | 0.36 | 32.94% |
| CNB Finl Corp | 74.86% | 1.52 | 1.53 | 22.20 | 0.66 | 25.10% |

*Appendix 2: Stocks with positive earnings surprises and consensus on expected earnings*

| *Company* | *Stock Price* | *Actual EPS* | *Expected EPS* | *EPS Surprise* | *Previous EPS Surprise* | *Std deviation in forecasts* | *PE* |
|---|---|---|---|---|---|---|---|
| SHAW GROUP INC | 9.7 | 0.42 | 0.3 | 40.00% | 1.45% | 2.00% | 3.87 |
| COASTAL BANCORP | 31.8 | 1.05 | 0.61 | 72.13% | 11.48% | 3.00% | 4.97 |
| FIRSTENERGY CP | 31.04 | 1.19 | 0.47 | 153.19% | 19.70% | 2.00% | 4.98 |
| RYLAND GRP INC | 48 | 2.5 | 1.24 | 101.61% | 12.58% | 4.00% | 5.64 |
| HARLAND(JOHN H) | 23.83 | 0.66 | 0.4 | 65.00% | 3.92% | 2.00% | 5.96 |
| SUNRISE ASSIST | 24.95 | 0.83 | 0.55 | 50.91% | 1.61% | 2.00% | 6.27 |
| MERITAGE CORP | 36.3 | 1.72 | 0.88 | 95.45% | 14.49% | 2.00% | 6.41 |
| AMERICA SVC GRP | 12.75 | 0.46 | 0.28 | 64.29% | 46.43% | 5.00% | 6.58 |
| BUNGE LTD | 27.3 | 0.98 | 0.33 | 196.97% | 12.94% | 4.00% | 6.93 |
| PULTE HOMES INC | 53.96 | 2.78 | 1.22 | 127.87% | 1.67% | 4.00% | 6.96 |
| POLARIS INDUS | 49.82 | 1.51 | 0.54 | 179.63% | 0.64% | 2.00% | 7.02 |
| BLACK & DECKER | 36.2 | 1.05 | 0.43 | 144.19% | 14.46% | 5.00% | 7.49 |
| YUM! BRANDS INC | 24.73 | 0.55 | 0.38 | 44.74% | 2.08% | 3.00% | 7.64 |
| BAUSCH & LOMB | 34.45 | 0.6 | 0.31 | 93.55% | 9.09% | 2.00% | 8.31 |
| TORO CO | 71.6 | 0.38 | 0.26 | 46.15% | 14.81% | 1.00% | 9.19 |
| NEWELL RUBBERMD | 29.93 | 0.49 | 0.27 | 81.48% | 2.22% | 3.00% | 11.37 |
| MCCLATCHY CO-A | 52.8 | 0.86 | 0.56 | 53.57% | 2.90% | 3.00% | 11.70 |
| DIEBOLD | 36.14 | 0.67 | 0.36 | 86.11% | 1.69% | 2.00% | 11.83 |
| INTL BUS MACH | 79.01 | 1.34 | 0.79 | 69.62% | 3.13% | 3.00% | 11.87 |
| COLUMBIA SPORTS | 38 | 0.72 | 0.26 | 176.92% | 5.19% | 0.00% | 12.32 |
| LEE ENTRPRS | 32.83 | 0.51 | 0.34 | 50.00% | 2.38% | 1.00% | 13.73 |
| GANNETT INC | 72.28 | 1.29 | 0.92 | 40.22% | 1.02% | 4.00% | 13.97 |
| SELECT INS GRP | 24.67 | 0.41 | 0.28 | 46.43% | 2.70% | 5.00% | 14.67 |
| LANDSTAR SYSTEM | 61.22 | 0.88 | 0.61 | 44.26% | 1.22% | 2.00% | 15.94 |
| BIOVAIL CORP | 40.1 | 0.6 | 0.38 | 57.89% | 2.17% | 3.00% | 16.40 |
| TRIBUNE CO | 46.85 | 0.57 | 0.38 | 50.00% | 21.05% | 4.00% | 16.68 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| FLIR SYSTEMS | 47.21 | 0.71 | 0.5 | 42.00% | 17.65% | 3.00% | 16.77 |
| EDUCATION MGMT | 41.91 | 0.7 | 0.5 | 40.00% | 14.29% | 2.00% | 19.39 |
| AVON PRODS INC | 57.57 | 0.8 | 0.41 | 95.12% | 2.13% | 1.00% | 19.78 |