



Price Momentum – a Predictive Model for Style and Sector Performance October 31, 2005

The ability to predict the relative performance of large vs. small capitalizations, growth vs. value, and various industry sectors, and successfully implement a strategy based on these predictions should have a very positive effect on overall investment returns. Indeed, as we have seen in our monitoring of investment performance based on these types of groupings over the years, being in the right groups (cap sector, style, industry) can make an enormous difference in investment success. This study examines the use of various price momentum measures applied to defined groupings of capitalization, growth vs. value, and macro industry group to predict near term relative returns among these groups. In the cases of capitalization and growth vs. value, we created multiple momentum measures. For macro industry groups, we built upon work we had done in 2003 examining industry momentum factors. Those who are familiar with Ford's Price Momentum model know that it has been successful in predicting individual common stock performance. This study examines whether the work done for individual stock selection can be applied in creating a predictive model for sector and style selection.

Capitalization Sector Momentum

In the first part of this study, we try to determine if average historical price change for groups of stocks based on market capitalization has any predictive effect on future returns of those groups. Stocks in the Ford universe were ranked from high to low based on market capitalization and then sectored into five equal-numbered quintiles. For each of the sectors, averages of 1-year, 1-quarter, and 1-month price gain was computed. Also, a price momentum factor, based on the one Ford developed for individual stocks, was created for each of the sectors. It should be noted that Ford's Price Momentum incorporates 1-year, 1-quarter, and 1-month price gains to predict near-term price performance for a stock. The mean reversion nature of individual stock price gains, which is factored into the model, helps to provide better performance than a simpler 1-year historical price gain measure. In the case of capitalization sectors we also found this to be true. The quintile performance shown represents the cap sector momentum performance. So, for example, if the largest cap quintile had the highest price momentum average, the large cap quintile would make up quintile 1. However, if in the following month, a different cap quintile had a higher price momentum, the largest cap could be in quintile 2. By measuring the performance of each of these averaged factors we are able to see that the capitalization sector price momentum was able to produce the best excess returns. This excess return for the top quintile of capitalization sector momentum over the Ford universe of stocks, which averaged 3.4% annually over the past 10 years, is the result of outperformance in 7 of the 10 years measured.

Capitalization Sector Price Momentum

total return (%)

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Ford Universe
12/94-12/95	36.3	30.1	27.4	25.3	18.1	27.4
12/95-12/96	15.1	23.8	22.1	21.8	19.1	20.5
12/96-12/97	29.1	27.9	35.1	12.2	24.9	25.9
12/97-12/98	5.1	-2.3	1.3	2.0	-4.6	0.4
12/98-12/99	31.3	32.6	27.1	6.7	9.7	21.4
12/99-12/00	9.2	18.8	-4.6	-6.7	-16.4	-0.1
12/00-12/01	43.8	21.3	9.5	19.6	12.8	22.0
12/01-12/02	-13.0	-20.5	-9.5	-22.4	-11.1	-15.2
12/02-12/03	53.5	52.5	70.1	65.1	116.1	70.3
12/03-12/04	12.6	17.2	32.1	20.5	20.6	20.6
Annualized	20.8	18.5	19.1	12.4	14.9	17.4
Ann. Std. Dev.	23.6	20.3	20.8	19.4	23.0	19.7

Value – Growth Style Momentum

Often, stocks that possess common attributes based on measures of value or growth perform similarly. To the extent that this occurs, we seek to identify the momentum of a style to predict its future relative performance. In order to classify companies in a value or growth category, the Ford universe was sorted into deciles based on 3 value factors; operating earnings yield, price to book value, and price to cash flow, and 3 growth factors; 5-year earnings growth, return on equity, and projected growth rate. The resulting decile rankings were combined to produce a value – growth score that measured each company’s relative position on the spectrum of these two classifications. Companies were sectored into equally-sized quintiles based on their value –growth score. For each of these quintiles, averages of 1-year, 1-quarter, and 1-month price gains were computed. Additionally, as was done for the capitalization sectors, a price momentum factor was created for each of the style quintiles. 1-month price gain delivered the best future return prediction performance in the case of style sectors. The quintile performance represents the average performance of the value – growth group based on the price momentum (in this case defined as 1-month price gain) for each. In each month, each quintile value –growth groups is placed into the quintile based on its average 1-month price gain. The positive excess return of the top quintile of style momentum and the fairly consistent distribution of quintile returns is a strong indication of the effectiveness of this factor for near term performance.

Value - Growth Style Momentum (1-month Price Gain)

total return (%)	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Ford Universe
12/94-12/95	31.8	27.0	25.3	24.5	28.2	27.4
12/95-12/96	22.2	16.5	22.3	20.7	19.9	20.5
12/96-12/97	27.5	22.5	31.4	25.2	22.1	25.9
12/97-12/98	-1.1	-2.2	-3.6	-2.7	11.2	0.4
12/98-12/99	55.1	40.6	9.6	4.8	3.0	21.4
12/99-12/00	17.5	2.5	-20.4	13.5	-16.0	-0.1
12/00-12/01	15.4	21.7	22.5	25.0	21.6	22.0
12/01-12/02	-5.1	-14.9	-18.1	-24.5	-14.5	-15.2
12/02-12/03	95.2	73.2	59.1	58.9	66.8	70.3
12/03-12/04	22.9	13.1	29.4	23.1	14.4	20.6
Annualized	25.5	17.9	13.3	14.9	13.6	17.4
Ann. Std. Dev.	24.1	21.4	21.1	19.2	22.2	19.7

Industry Sector Momentum

In the April 2003 Special Study we examined price momentum for the 15 Ford macro industry sectors. In that study we found that industry average 1-year price change was a useful measure of industry momentum and that it was a better predictor of industry sector returns than Ford’s price momentum model created for each industry. A main finding of that study was that the 1-month price gain mean reversion effect that we observe in individual stocks does not carry through to industry sectors. Although not monotonic, the distribution from highest to lowest momentum sectors still shows the ability of 1-year price change to predict macro industry sector performance fairly well. As shown, the top sector produced an average annual excess return over the Ford universe of 10.5%.

Macro Industry Group Momentum (1-year Price Gain)

total return (%)	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8	Sector 9	Sector 10	Sector 11	Sector 12	Sector 13	Sector 14	Sector 15	Ford Universe
12/94-12/95	42.6	28.7	21.8	22.7	32.9	11.2	29.4	41.7	9.2	6.8	14.4	38.1	21.1	4.3	12.6	27.4
12/95-12/96	22.5	28.0	22.8	14.9	18.2	13.2	7.0	23.0	20.0	18.0	8.7	41.4	23.3	38.0	21.9	20.5
12/96-12/97	25.3	36.8	51.3	15.4	34.5	30.4	30.1	17.8	31.8	10.7	20.4	21.0	21.6	31.2	-11.1	25.9
12/97-12/98	9.7	-3.8	23.1	-3.7	-6.1	-10.7	5.0	0.6	1.5	10.8	3.1	-28.2	-21.6	-23.7	-20.3	0.4
12/98-12/99	75.7	34.7	7.5	15.2	-2.3	-12.7	11.5	5.0	-4.1	-8.7	-1.0	3.9	25.8	20.9	8.2	21.5
12/99-12/00	19.8	3.6	23.3	26.4	20.1	-9.8	3.1	-17.0	-13.7	16.0	-2.2	-16.0	19.4	-2.9	-23.1	-0.1
12/00-12/01	4.8	32.2	16.6	1.9	28.3	27.6	8.4	7.0	12.9	33.6	25.5	7.6	49.0	37.9	-7.3	21.9
12/01-12/02	9.2	3.2	-10.9	9.1	-4.0	-4.2	12.8	0.7	-5.5	-7.9	-29.2	-6.4	-26.3	-10.7	-39.2	-15.3
12/02-12/03	88.8	57.1	29.7	67.5	55.2	56.6	46.4	63.5	38.6	60.8	52.0	55.0	61.8	106.3	72.9	70.4
12/03-12/04	7.7	51.1	50.0	20.0	22.8	1.9	22.8	16.0	24.9	26.2	18.8	27.9	42.1	21.9	29.3	20.7
Annualized	28.0	25.6	22.3	17.7	18.5	8.5	16.9	13.9	10.3	15.1	9.1	11.5	18.4	18.0	0.2	17.5
Ann. Std. Dev.	26.1	20.5	21.6	19.3	17.3	18.2	19.7	19.2	18.8	18.5	20.3	20.7	22.4	25.7	31.3	19.7

In order to match the quintile presentation of the other momentum measures, the industry sector momentum was divided into quintiles.

Macro Industry Group Momentum Quintiles

total return (%)	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Ford Universe
12/94-12/95	40.7	27.7	27.0	25.0	17.1	27.4
12/95-12/96	20.5	15.3	15.9	18.4	32.0	20.5
12/96-12/97	42.8	20.7	20.2	24.0	21.8	25.9
12/97-12/98	5.6	-1.9	-2.9	9.0	-7.8	0.4
12/98-12/99	95.7	19.8	2.5	-4.3	10.0	21.4
12/99-12/00	-0.8	4.3	-2.4	-6.4	-4.1	-0.1
12/00-12/01	27.9	19.2	28.5	17.0	9.6	22.0
12/01-12/02	3.6	-6.4	-16.8	-23.5	-32.8	-15.2
12/02-12/03	71.0	72.1	55.6	66.5	85.6	70.3
12/03-12/04	11.9	18.3	19.5	25.6	27.3	20.6
Annualized	28.8	17.3	13.1	12.9	12.3	17.4
Ann. Std. Dev.	23.4	20.7	18.2	21.1	29.1	19.7

Creating a Cap Sector, Style, Industry Momentum Composite

Since the sector and style momentum measures appeared to be helpful in predicting their future returns, we decided to examine whether a combination of these factors would produce additional benefits to performance. This was done in two ways. The first was to simply sum the quintile scores from the three momentum measures and then sector this composite score into deciles with the highest combination of momentum scores in decile 1. In this way each factor has an equal weight in the new composite score. The results were interesting. Annualized excess return was nearly 12% and the distribution of returns across deciles declined fairly steadily as industry momentum decreased.

Equally-weighted Momentum Scores for Cap, Style, and Industry

	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	Ford Universe
12/94-12/95	43.8	31.5	34.7	30.0	27.8	24.9	25.6	22.7	19.7	14.8	27.4
12/95-12/96	16.0	17.9	23.3	17.3	22.2	18.7	22.6	17.9	23.0	25.4	20.5
12/96-12/97	30.5	31.2	33.6	32.2	26.6	26.5	26.6	24.9	18.1	9.0	25.9
12/97-12/98	1.7	4.5	-4.6	2.9	-3.7	0.1	0.0	-1.1	3.1	0.4	0.4
12/98-12/99	102.2	56.2	34.9	26.0	14.7	8.6	5.7	-2.5	-3.5	-1.8	21.4
12/99-12/00	15.6	17.7	15.3	3.1	1.2	-3.6	-5.9	-12.3	-13.1	-20.2	-0.1
12/00-12/01	37.3	26.6	18.9	20.0	20.3	21.6	24.3	23.1	12.7	10.7	22.0
12/01-12/02	4.6	-0.5	-14.7	-15.3	-18.6	-21.2	-18.3	-20.7	-23.1	-24.8	-15.2
12/02-12/03	62.8	59.7	68.1	72.0	66.8	63.1	66.0	76.1	80.7	88.1	70.3
12/03-12/04	7.7	14.5	23.1	20.2	26.8	25.4	20.9	20.8	25.9	21.4	20.6
Annualized	29.3	24.6	21.3	18.9	16.4	14.4	14.7	12.2	11.5	8.9	17.4
Ann. Std. Dev.	22.7	21.9	19.8	19.5	19.4	19.6	20.7	21.7	22.7	24.4	19.7

As a second way to combine these momentum measures, we created a portfolio which combined only those companies that were in the top quintile of each momentum measure. This resulted in monthly portfolios that ranged from just a few stocks to around 100. As could be expected, the turnover for this portfolio when rebalanced monthly was quite high. However, returns were also so high that reducing the rebalancing frequency to quarterly still resulted in strong performance relative the Ford universe of stocks.

Top Quintile in All Three Portfolio (rebalanced quarterly)

total return (%)

	Portfolio	Ford Universe	Portfolio %Turnover
12/94-12/95	28.9	27.5	216.0
12/95-12/96	27.8	19.9	400.0
12/96-12/97	32.7	25.4	339.0
12/97-12/98	19.5	0.0	346.9
12/98-12/99	163.5	22.1	316.3
12/99-12/00	18.2	-0.4	317.9
12/00-12/01	44.5	22.0	400.0
12/01-12/02	3.5	-15.3	348.2
12/02-12/03	81.8	70.8	400.0
12/03-12/04	16.9	20.3	374.6
Annualized	38.4	17.3	345.9
Ann. Std. Dev.	34.5	23.5	

Conclusion

Historical price performance of groups of stocks defined based on market capitalization, style or industry group can be used to predict future performance of those groups. In the case of those in this study, the most effective price momentum factors varied between the long-term price gain with mean reversion, short-term price gain only, and long-term price gain only. While sector or style momentum measures worked individually, combining them had the effect of improving the amount of excess return and the consistency of the return distribution. Finally, using the momentum measures created shows promising results as a means of portfolio selection that might be worth refining to further manage turnover.