

EARNINGS MOMENTUM STRATEGIES

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Introduction

- When viewed in terms of their time horizons, many investment strategies studied in the academic literature can be assorted into three types:

- 1) Long holding period (1 to 5 years) strategies

Value strategy where stocks with low price/earnings, price/book, price/cash flow ratios tend to earn higher returns than the market (Graham & Dodd 1934, Dreman 1997, Fama & French 1992, Lakonishok, Shleifer & Vishny 1994).

Reversion strategy where extreme long-term past losers tend to outperform the market over the subsequent several years (De Bondt & Thaler 1985 and 1987).

In addition to the United States, value strategies are found to be effective also in France, Germany, Switzerland, U.K. and Japan (Capaul, Rowley, & Sharpe 1993)

Introduction

2) Intermediate holding period (3 months to 1 year) strategies

Price, sales and earnings momentum strategy where stocks having positive past changes in price, sales or earnings tend to have higher returns than the market.

Calendar strategy where stocks purchased in last quarter of the year and sold in first quarter of following year tend to have superior performance; also where small cap stocks purchased in December and sold in January tend to have superior performance.

Relative strength strategy where stocks with good relative strength and positive earnings surprises tend to have superior performance.

Analyst neglect strategy where stocks with low analyst coverage tend to have superior performance; also where earnings momentum strategies are enhanced for stocks with low analyst coverage (Hong, Lim & Stein 1999).

Institutional Investor neglect strategy where stocks not widely followed by institutional investors tend to have superior performance.

Introduction

3) Short holding period (days to weeks) strategies

Post-earnings announcement drift strategy where a substantial portion of the longer-term gain or loss arising from an earnings surprise occurs within days of the announcement.

Technical strategies where short-term return reversals are predicted from mathematical analyses of prices.

- While value strategies have existed at least since after the 1929 stock market crash, the technique of tracking changes in analysts' forecasts became popular only in the last two decades.
- We focus only on price and earnings momentum strategies in this monograph.

Background to Value Strategies

- We provide a short digression on value strategies to place the price and earnings momentum strategies in perspective.
- Later we suggest a trading model that combines the edges in both value and price and earnings momentum strategies.

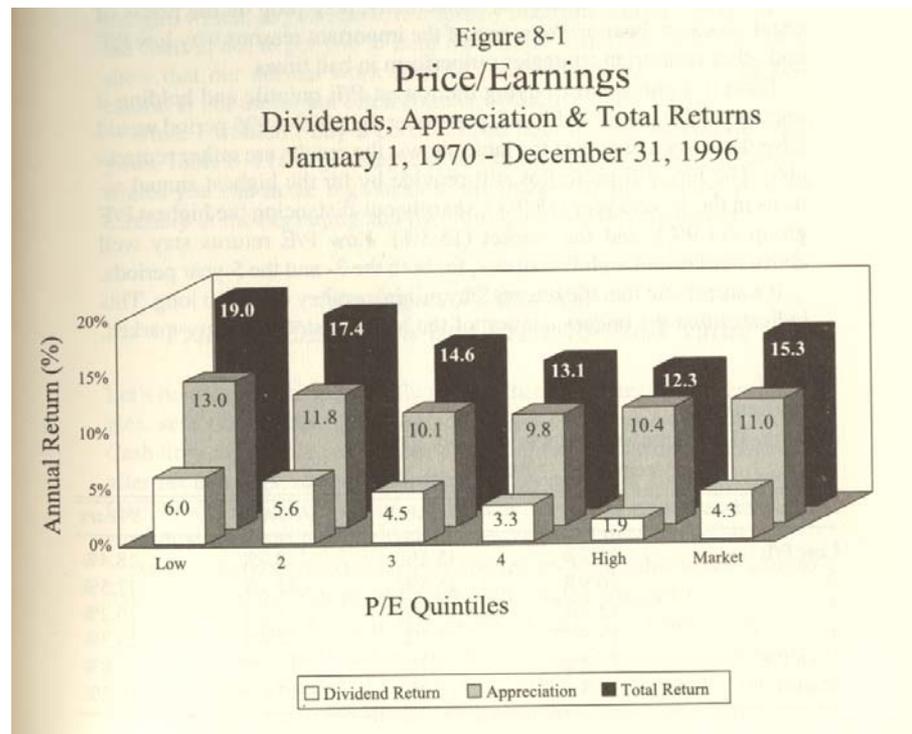


Figure 1: Returns of the low P/E strategy for the 27 years between 1/1/1970 and 12/31/1996, based on the largest 1500 companies on the Compustat tapes. The stocks are sorted quarterly into five groups with the same number of stocks according to their P/E rankings. Each of the four portfolios, corresponding to the four quarters of the year, are regrouped the following quarter. The return shown is the average over the returns of the four portfolios (Dreman 1998).

Background to Value Strategies

Table I
Returns for Decile Portfolios Based on One-Dimensional Classifications by Various Measures of Value

At the end of each April between 1968 and 1989, 10-decile portfolios are formed in ascending order based on B/M , C/P , E/P , and GS . B/M is the ratio of book value of equity to market value of equity; C/P is the ratio of cash flow to market value of equity; E/P is the ratio of earnings to market value of equity, and GS refers to preformation 5-year average growth rate of sales. The returns presented in the table are averages over all formation periods. R_t is the average return in year t after formation, $t = 1, \dots, 5$. AR is the average annual return over 5 postformation years. CR_5 is the compounded 5-year return assuming annual rebalancing. $SAAR$ is the average annual size-adjusted return computed over 5 postformation years. The glamour portfolio refers to the decile portfolio containing stocks ranking lowest on B/M , C/P , or E/P , or highest on GS . The value portfolio refers to the decile portfolio containing stocks ranking highest on B/M , C/P , or E/P , or lowest on GS .

	Glamour									Value
	1	2	3	4	5	6	7	8	9	10
Panel A: B/M										
R_1	0.110	0.117	0.135	0.123	0.131	0.154	0.154	0.170	0.183	0.173
R_2	0.079	0.107	0.140	0.145	0.153	0.156	0.169	0.164	0.182	0.188
R_3	0.107	0.132	0.155	0.167	0.165	0.172	0.191	0.207	0.196	0.204
R_4	0.081	0.133	0.136	0.160	0.170	0.169	0.188	0.204	0.213	0.207
R_5	0.088	0.137	0.163	0.175	0.171	0.176	0.216	0.201	0.206	0.215
AR	0.093	0.125	0.146	0.154	0.158	0.166	0.184	0.189	0.196	0.198
CR_5	0.560	0.802	0.973	1.045	1.082	1.152	1.320	1.375	1.449	1.462
$SAAR$	-0.043	-0.020	-0.003	0.004	0.006	0.012	0.024	0.028	0.033	0.035
Panel B: C/P										
R_1	0.084	0.124	0.140	0.140	0.153	0.148	0.157	0.178	0.183	0.183
R_2	0.067	0.108	0.126	0.153	0.156	0.170	0.177	0.180	0.183	0.190
R_3	0.096	0.133	0.153	0.172	0.170	0.191	0.191	0.202	0.193	0.204
R_4	0.098	0.111	0.146	0.159	0.166	0.172	0.182	0.192	0.223	0.218
R_5	0.108	0.134	0.161	0.162	0.187	0.177	0.191	0.209	0.212	0.208
AR	0.091	0.122	0.145	0.157	0.166	0.171	0.180	0.192	0.199	0.201
CR_5	0.543	0.779	0.969	1.074	1.158	1.206	1.283	1.406	1.476	1.494
$SAAR$	-0.049	-0.025	-0.006	0.005	0.013	0.019	0.025	0.034	0.037	0.039

- Value strategies of the sort championed by David Dreman (low P/E, price/book, price/cash flow, etc) has outperformed the market by 3 to 4 percent over a long time horizon.
- A study by Lakonishok, Shleifer and Vishny, *Journal of Finance*, XLIX, 5, 1994, (left panel) shows that “glamour” or “growth” stocks (i.e. low E/P, book/price, cash flow/price stocks) underperform value stocks for up to 5 years after portfolio formation.
- This performance differential remains after adjusting for size (i.e. subtracting the return of a reference portfolio of stocks having the same market capitalization as those in each decile portfolio), indicating that this is not a “small-cap” effect.

Background to Value Strategies

- However, value strategies have done poorly during the asset bubble of 1998 to 2000.



Note: The Vanguard Windsor II Fund is one of the largest value-oriented mutual funds in the U.S.

Inefficient Earnings Forecasts

- The inefficiency of analysts' earnings forecasts is widely viewed as the primary reason for "price continuation" observed over the 3 month to 1 year horizon.
- Studies of analysts' earnings forecasts (e.g. Easterwood and Nutt, 1998) reveal that:
 - Analysts interpret new earnings information optimistically, i.e. they underreact to bad news and overreact to good news.
 - Thus they normally produce upwardly biased forecasts upon new earnings information.
 - Then they systematically revise these forecasts *downwards* over the next 12 months regardless of whether the earnings information at the outset was favorable or unfavorable.
- These biases arise from the economic contingencies within which the analysts operate, such the use of favorable estimates to generate underwriting, investment banking and commission businesses.
- **However, stock prices appear to always *underreact* to short-term earnings information, whether favorable or unfavorable, thus providing profits to earnings momentum strategies.**

Price Momentum

- Following Chan, Jegadeesh and Lakonishok, *Financial Analysts Journal*, 55(6) 1999, p. 80-89, the price momentum variable R_6 is defined as the stock's past compound return going back 6 months before portfolio formation.
- This variable is found to have the greatest predictive power among the various momentum variables, in the sense that stocks ranked highest (resp. lowest) by the variable advanced (resp. declined) the most for up to 3 years following portfolio formation.
- It is surmised that the market responds slowly to a broad set of information, including (but not limited to) earnings information and long term profitability, thus providing profits to price momentum strategies.

Earnings Momentum

- Again following Chan, Jegadeesh and Lakonishok, *Financial Analysts Journal*, 55(6) 1999, p. 80-89, the following two earnings momentum variables are defined:

- *Standardized unexpected earnings (SUE)*

$$SUE_{i,t} = \frac{e_{i,q} - e_{i,q-4}}{\sigma_{i,t}}$$

where $e_{i,q}$ is the most recently announced quarterly earnings per share as of month t for stock i ; $e_{i,q-4}$ is the earnings per share 4 quarters ago; $\sigma_{i,t}$ is the standard deviation of $e_{i,q} - e_{i,q-4}$ over the preceding 8 quarters.

- *6-month moving average of past changes in consensus earnings forecasts (REV6)*

$$REV6 = \sum_{j=0}^6 \frac{f_{i,t-j} - f_{i,t-j-1}}{p_{i,t-j-1}}$$

where $f_{i,t}$ is the consensus (mean) I/B/E/S estimate at month t of firm i 's earnings for the current fiscal year and $p_{i,t}$ is the stock price at month t .

- The correlations between $R6$, SUE and $REV6$:

	$R6$	SUE	$REV6$
$R6$	1		
SUE	0.29	1	
$REV6$	0.29	0.44	1

Return as Function of Past Price and Earnings Momentum

- The return differential between top and bottom decile portfolios ranked *ex ante* by the various momentum variables are found to be substantial:

Table 2. After-Formation Returns for Portfolios Based on Past Return Momentum and Earnings Momentum: One-Way Classification, 1973–93 Data

	1 (Low)	2	3	4	5	6	7	8	9	10 (High)	10–1 (pps)
<i>A. Return: Classification based on prior six-month return</i>											
Past six months	-30.8	-12.6	-5.5	0.0	5.0	9.9	15.3	21.9	31.9	69.6	100.4
Six months APF	6.1	8.6	9.3	9.6	10.2	10.4	10.5	11.1	12.0	14.9	8.8
First year APF	14.3	18.5	19.8	20.8	21.4	22.2	22.3	23.5	24.8	29.7	15.4
Second year APF	20.5	20.1	20.5	20.6	20.8	20.8	20.4	20.8	20.7	19.9	-0.6
Third year APF	19.4	19.6	19.7	19.6	19.9	20.2	20.5	20.1	20.8	20.6	1.2
<i>B. Return: Classification based on standardized unexpected earnings</i>											
Past six months	-5.2	-0.4	2.7	6.2	9.9	12.7	14.9	16.6	18.6	22.6	27.8
Six months APF	5.1	6.3	8.1	9.1	10.5	11.4	11.4	11.5	11.9	11.9	6.8
First year APF	13.8	16.0	19.3	20.5	22.5	23.2	22.7	22.6	22.5	21.3	7.5
Second year APF	16.9	18.3	19.4	21.2	21.8	21.5	21.8	21.1	20.4	18.0	1.1
Third year APF	18.5	18.9	20.4	21.6	20.8	21.1	21.1	20.8	19.7	17.9	-0.6
<i>C. Return: Classification based on analyst forecast revisions</i>											
Past six months	-6.6	0.2	3.2	5.8	8.3	9.9	11.6	15.6	19.1	24.8	31.4
Six months APF	4.6	7.0	7.2	7.9	8.3	8.2	8.7	10.6	11.6	12.3	7.7
First year APF	13.2	15.9	16.4	17.1	17.7	17.4	17.7	20.3	21.6	22.9	9.7
Second year APF	15.9	18.0	17.8	18.7	18.0	17.1	17.8	17.5	18.8	21.4	5.5
Third year	17.7	18.2	17.4	17.3	18.6	17.9	17.6	18.9	19.4	20.2	2.5

APF = after portfolio formation.

Source: Chan, Jegadeesh and Lakonishok, *Financial Analysts Journal*, 55(6) 1999, p. 80-89.

Return as Function of Past Price and Earnings Momentum

- Each momentum variable contributes predictive power at the margin (i.e. while holding the other variables fixed):

Financial Analysts Journal

Table 3. After-Formation Returns for Portfolios Classified by Past Return Momentum and Earnings Momentum: Two-Way Classification, 1973–93 Data

<i>A. Standardized unexpected earnings and prior six-month return</i>									
SUE:	1 (Low)	2	3	1	2	3	1	2	3 (High)
R6:	1 (Low)	1	1	2	2	2	3	3	3 (High)
Return									
First six months	5.5	9.4	8.5	7.6	10.6	11.3	7.4	11.8	13.6
First year	14.2	19.0	15.7	18.3	22.4	21.6	19.0	25.3	25.7
<i>B. Revisions in analyst forecasts and prior six-month return</i>									
REV6:	1 (Low)	2	3	1	2	3	1	2	3 (High)
R6:	1 (Low)	1	1	2	2	2	3	3	3 (High)
Return									
First six months	4.2	6.3	8.5	7.7	8.8	11.2	9.3	10.3	13.0
First year	11.3	13.4	15.2	18.0	18.6	21.4	21.4	21.5	24.6
<i>C. Revisions in analyst forecasts and standardized unexpected earnings</i>									
REV6:	1 (Low)	2	3	1	2	3	1	2	3 (High)
SUE:	1 (Low)	1	1	2	2	2	3	3	3 (High)
Return									
First six months	5.1	6.5	9.3	8.4	9.3	11.1	9.3	9.6	12.1
First year	13.7	15.3	19.0	18.4	19.6	22.4	18.5	18.7	22.0

Source: Chan, Jegadeesh and Lakonishok, *Financial Analysts Journal*, 55(6) 1999, p. 80-89.

- From above table, we see that:
 - when prior returns were held fixed, stocks with high *SUEs* earned 4.3% more on average than those with low *SUEs* in the first 6 months; when *SUE* is held fixed, stocks with high prior returns earned 3.1% more on average than those with low prior returns (regroup the rankings to see this).
 - Similarly, the marginal contribution of *REV6* in the first 6 months was 3.8% compared with 4.5% for past returns.
- For a time horizon of 6 months, *SUE* appears to have the most marginal predictive power.

Momentum for Large-Cap Stocks

- The same effect, albeit with slightly smaller return differentials between the various decile portfolios, occurs in larger-cap stocks as well:

Table 4. Returns for Momentum Portfolios Formed from a Sample of Large-Cap Companies, 1973–93 Data

<i>A. Mean return in first after-formation year from one-way classification</i>											
Ranking Criterion	1 (Low)	2	3	4	5	6	7	8	9	10 (High)	10 – 1 (pps)
R6	8.6	14.5	15.6	17.0	176.0	17.6	18.2	18.8	20.2	22.6	14.0
SUE	14.7	14.7	16.8	17.1	18.3	18.7	18.3	19.0	19.2	17.6	2.9
REV6	13.4	15.4	16.3	16.2	16.3	17.4	17.7	18.1	19.1	21.0	7.6
<i>B. Mean return in first after-formation year from two-way classification</i>											
SUE rank:	1(Low)	2	3	1	2	3	1	2	3	3 (High)	
R6 rank:	1(Low)	1	1	2	2	2	3	3	3	3 (High)	
SUE and R6	13.3	15.4	13.6	16.2	18.0	18.6	17.5	20.9	21.0		
REV6 and R6	12.8	13.9	13.1	16.4	17.5	19.0	20.0	19.1	21.3		

Note: The sample included all stocks from the larger sample with beginning-of-month market value of equity above the median market capitalization of NYSE issues.

Source: Chan, Jegadeesh and Lakonishok, *Financial Analysts Journal*, 55(6) 1999, p. 80-89.

- The marginal predictive power of *SUE* is lower for large-cap stocks because additional sources of information are available that provide the outlook for these stocks.

Earnings Announcement Returns

- Returns around earnings announcement periods tend to “continue the trend” forebore by the momentum variables:

Table 5. Earnings Announcement Returns and Analyst Forecast Revisions after Portfolio Formation, 1973–93 Data

	1 (Low)	2	3	4	5	6	7	8	9	10 (High)
<i>A. Classification based on prior six-month return</i>										
	Abnormal Return around Earnings Announcements ^a									
First announcement APF	-1.1	-0.4	-0.1	0.0	0.2	0.3	0.4	0.6	0.9	1.5
Second announcement APF	-0.2	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.5	0.8
Third announcement APF	0.2	0.1	0.2	0.1	0.2	0.1	0.3	0.3	0.3	0.5
Fourth announcement APF	0.3	0.1	0.2	0.1	0.1	0.0	0.1	0.2	0.1	0.1
	Revisions in Analyst Forecasts ^b									
Average over 6 months APF	-2.138	-0.578	-0.368	-0.282	-0.220	-0.152	-0.117	-0.068	-0.041	0.004
Average for months 7–12 APF	-1.843	-0.555	-0.378	-0.318	-0.248	-0.206	-0.191	-0.165	-0.153	-0.180
<i>B. Classification based on standardized unexpected earnings</i>										
	Abnormal Return around Earnings Announcements									
First announcement APF	-1.2	-0.8	-0.5	-0.1	0.3	0.5	0.7	0.8	1.1	1.2
Second announcement APF	-0.3	-0.2	0.1	0.1	0.4	0.4	0.4	0.3	0.3	0.5
Third announcement APF	0.2	0.1	0.3	0.3	0.2	0.3	0.2	0.1	0.1	0.1
Fourth announcement APF	0.3	0.5	0.2	0.1	0.2	0.1	-0.1	-0.1	0.0	-0.2
	Revisions in Analyst Forecasts									
Average over 6 months APF	-1.480	-0.866	-0.647	-0.453	-0.325	-0.198	-0.119	-0.095	-0.054	0.005
Average for months 7–12 APF	-1.160	-0.817	-0.659	-0.352	-0.352	-0.247	-0.296	-0.232	-0.199	-0.155
<i>C. Classification based on past analyst forecast revisions</i>										
	Abnormal Return around Earnings Announcements									
First announcement APF	-0.6	-0.4	-0.2	-0.1	-0.1	0.0	0.2	0.3	0.5	0.9
Second announcement APF	-0.2	0.0	0.0	0.0	-0.1	0.2	0.2	0.1	0.3	0.4
Third announcement APF	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0
Fourth announcement APF	0.2	0.2	0.1	0.0	-0.2	0.1	0.0	0.0	0.0	-0.1
	Revisions in Analyst Forecasts									
Average over 6 months APF	-2.027	-0.529	-0.323	-0.231	-0.158	-0.158	-0.116	-0.057	-0.037	-0.321
Average for months 7–12 APF	-1.994	-0.516	-0.320	-0.237	-0.190	-0.181	-0.153	-0.135	-0.156	-0.332

^aAbnormal returns around earnings announcement dates are relative to the equally weighted market index and are cumulated from two days before to one day after the date of earnings announcement.

^bAverages of percentage revisions relative to the beginning-of-month stock price in monthly median I/B/E/S estimates of current fiscal year earnings per share are reported.

Source: Chan, Jegadeesh and Lakonishok, *Financial Analysts Journal*, 55(6) 1999, p. 80–89.

- The trend continues, i.e. the market continues to be surprised, even at two quarterly announcements following portfolio formation.
- About 41% of the superior performance in first 6 months of the price momentum strategy occurred around the earnings announcement dates.

Analysts' Forecast Revisions

- Referring to table on previous page, the analysts' earnings forecast revisions were mostly negative regardless of the decile, indicating that their initial forecasts tend to be overly optimistic.
- They tend to be more optimistic regarding negative price momentum and bad earnings surprises than positive price momentum and good earnings surprises.
- This behavior is possibly explained by the fact that it is not in an analyst's best interest to be the "first messenger" of bad news (a negative forecast) since he or she may antagonize corporate managers.
- Analysts prefer to wait for additional evidence of poor earnings and then join a growing chorus of revisions.
- Thus earnings forecasts are gradually revised downwards for *all* companies.

More on Analysts' Behavior

- Hong, Lim and Stein, *Journal of Finance* 55(1) 2000:265-295, hypothesized that firm-specific information, especially negative information, diffuses only gradually across the investing public.
- While their thesis is academic, their empirical findings are very interesting; based on data from 1980 to 1996, they established the following:
 - Firm size is the dominant factor that determines analyst coverage (number of analysts following a stock).
 - The profitability of momentum strategies declines sharply with firm size.
 - Given a fixed size, momentum strategies work better for stocks with low analyst coverage.
 - The effect of analyst coverage is greater for stocks that are past losers than for past winners (losers with low analyst coverage has more momentum than those with high analyst coverage).

Factors Affecting Analyst Coverage

- Even as late as 1996, only about 60% of the stocks on the NYSE, AMEX and NASDAQ has analyst coverage.
- The coverage is poorest for the bottom quartile ranked by firm size with only 18% of the firms being followed by analysts; the coverage is almost complete for the top quartile.

Table I
Descriptive Statistics for Analyst Coverage

Descriptive statistics for analyst coverage for NYSE, AMEX and NASDAQ stocks, excluding ADRs, REITs, closed-end funds, and primes and scores during the period 1976 to 1996. Panel A reports for the even years between 1976 and 1996 the number of firms in the sample, their mean and median size, the number of analysts at various coverage percentiles and the percentage of firms that had no coverage. Panel B reports for 1988 by firm size the same statistics as in Panel A.

Panel A: All Stocks, 1976-1996

YEAR	No. of Firms	Mean Size (Millions)	Median Size (Millions)	# of Analysts at Coverage Percentiles										% of firms un-covered
				10	20	30	40	50	60	70	80	90		
76	4402	183.6	18.7	0	0	0	0	0	0	0	1	4	77.3%	
78	4472	176.4	22.7	0	0	0	0	0	0	0	2	5	71.5%	
80	4329	248.9	34.6	0	0	0	0	0	1	2	4	9	58.2%	
82	4754	249.3	30.3	0	0	0	0	0	1	2	5	11	59.3%	
84	5049	332.3	44.4	0	0	0	0	0	1	3	6	12	50.8%	
86	5364	387.4	42.5	0	0	0	0	0	1	3	6	14	50.5%	
88	5932	402.2	32.6	0	0	0	0	0	1	3	5	12	50.1%	
90	5567	500.7	34.5	0	0	0	0	1	2	3	7	13	45.4%	
92	5438	672.8	49.8	0	0	0	0	1	2	3	6	13	46.7%	
94	5890	802.9	81.1	0	0	0	0	1	3	4	7	13	40.0%	
96	6460	978.1	90.8	0	0	0	1	2	3	4	7	12	36.9%	

Panel B: Breakdown of Analyst Coverage by Firm Size for 1988

NYSE/AMEX Breakpoints (Percentiles)	No. of Firms	Mean Size (Millions)	Median Size (Millions)	# of Analysts at Coverage Percentiles										% of firms un-covered
				10	20	30	40	50	60	70	80	90		
Below 20 th	2597	9.6	8.3	0	0	0	0	0	0	0	0	1	82.0%	
Between 20 th & 40 th	1363	45.1	42.5	0	0	0	0	1	1	2	3	4	41.7%	
Between 40 th & 60 th	937	147.1	133.3	0	0	1	2	3	4	5	7	9	21.5%	
Between 60 th & 80 th	607	554.0	495.8	1	4	6	7	8	10	12	14	17	7.7%	
Above 80 th	431	4235.7	2390.7	8	13	16	19	21	23	26	28	30	5.6%	

Source: Hong, Lim and Stein, *Journal of Finance* 55(1) 2000:265-295

Factors Affecting Analyst Coverage

- Firm size (market cap), trading turnover, book/market value are some of the factors affecting the number of analysts following a stock, with firm size being by far the dominant factor.

Table II
Determinants of Analyst Coverage, 12/1988

Dependent variable is log (1+analyst coverage). Log Size is the log of a firm's year-end market value. NASD is a NASDAQ dummy. Book/Mkt is the ratio of a firm's year-end book to market value. Beta is a firm's market beta. P is a firm's share price. Var is the variance of a firm's return using last 200 observations from year-end. R_k is the rate of return of a firm lagged k years for k=0,1,2,3,4. T-O is a firm's turnover defined as prior six months' trading volume divided by shares outstanding. NASD*T-O is the NASDAQ dummy times firm turnover. OPT is a dummy for whether a firm has options trading on CBOE, NYSE, AMEX, Philadelphia or Pacific stock exchanges. IND is a set of CRSP industry dummies. There are 2012 observations. t-statistics are in parentheses.

Source: Hong, Lim and Stein, *Journal of Finance* 55(1) 2000:265-295

Model #	Log Size	NASD	Book/Mkt	Beta	1/P	Var	R_0	R_1	R_2	R_3	R_4	T-O	NASD* T-O	OPT	IND	R ²
1	0.54 (52.67)	0.03 (0.99)													No	0.61
2	0.56 (52.90)	0.04 (1.21)													Yes	0.63
3	0.55 (53.03)	0.05 (1.50)	0.12 (3.15)												No	0.61
4	0.57 (52.22)	0.07 (2.00)	0.17 (4.30)												Yes	0.63
5	0.50 (48.41)	0.07 (2.28)		0.38 (11.54)											No	0.64
6	0.51 (46.11)	0.09 (2.62)		0.40 (10.94)											Yes	0.65
7	0.57 (49.87)	0.09 (2.59)			-0.52 (-3.12)	-1.27 (-3.23)	-0.50 (-9.46)	-0.28 (-6.06)	-0.28 (-6.00)	-0.04 (-0.85)	-0.16 (-3.46)				Yes	0.65
8	0.52 (51.46)	-0.02 (-0.54)										3.82 (8.18)	-0.53 (-0.93)		No	0.64
9	0.50 (38.83)	-0.02 (-0.48)										3.52 (7.32)	-0.37 (-0.64)	0.12 (2.48)	No	0.64

Effect of Size on Momentum

- With exception of the smallest cap stocks, momentum profits decline monotonically with firm size.
- Smaller firms have slower information diffusion, less investor participation and thinner markets, all leading to greater momentum.
- Bulk of the momentum effect appears to come from losers rather than winners.

Table III
Momentum Strategies, 1/1980-12/1996, using Raw Returns and Sorting by Size

This table includes all stocks. The relative momentum portfolios are formed based on six-month lagged raw returns and held for six months. The stocks are ranked in ascending order on the basis of six-month lagged returns. Portfolio P1 is an equally weighted portfolio of stocks in the worst performing 30 percent, portfolio P2 includes the middle 40 percent, and portfolio P3 includes the best performing 30 percent. This table reports the average monthly returns of these portfolios and portfolios formed using size-based subsamples of stocks. Using NYSE/AMEX decile breakpoints, the smallest firms are in size class 1, the next in 2, and largest in 10. Mean (median) size is in millions. t-statistics are in parentheses.

PAST	Size Class (NYSE/AMEX Decile Breakpoints)										
	All Stocks	1	2	3	4	5	6	7	8	9	10
P1	0.01043 (2.44)	0.02106 (4.44)	0.00653 (1.37)	0.00231 (0.52)	0.00194 (0.43)	0.00469 (1.05)	0.00573 (1.32)	0.00606 (1.43)	0.01010 (2.51)	0.00922 (2.25)	0.01258 (3.37)
P2	0.01378 (4.48)	0.01662 (4.97)	0.01290 (3.84)	0.01280 (3.88)	0.01244 (3.75)	0.01395 (4.18)	0.01374 (4.14)	0.01375 (4.27)	0.01393 (4.40)	0.01401 (4.43)	0.01355 (4.50)
P3	0.01570 (4.35)	0.01733 (4.40)	0.01507 (3.89)	0.01664 (4.35)	0.01570 (4.05)	0.01655 (4.26)	0.01608 (4.26)	0.01491 (4.13)	0.01436 (4.04)	0.01363 (3.96)	0.01278 (3.84)
P3-1	0.00527 (2.61)	-0.00374 (-1.77)	0.00854 (3.60)	0.01433 (6.66)	0.01376 (6.10)	0.01187 (5.32)	0.01035 (4.80)	0.00885 (3.72)	0.00425 (1.90)	0.00441 (1.73)	0.00021 (0.08)
P2-P1											
P3-P1		----	0.746	0.732	0.763	0.780	0.774	0.869	0.901	1.086	----
Mean Size		7	21	44	79	138	242	437	806	1658	7290
Median Size		7	21	43	78	136	237	430	786	1612	4504
Mean Analyst		0.1	0.5	1.1	2.0	3.2	5.0	7.3	10.6	15.3	21.4
Median Analyst		0.0	0.0	0.7	1.3	2.5	4.4	6.9	10.5	15.7	22.4

Source: Hong, Lim and Stein, *Journal of Finance* 55(1) 2000:265-295

Effect of Analyst Coverage on Momentum

- Momentum is more pronounced in stocks with low residual analyst coverage (after adjusting for firm size).

Table IV
Momentum Strategies, 1/1980-12/1996, using Raw Returns and Sorting by Model 1 Residuals

This table includes only stocks above the NYSE/AMEX 20th percentile. The relative momentum portfolios are formed based on six-month lagged raw returns and held for six months. The stocks are ranked in ascending order on the basis of six-month lagged returns. Portfolio P1 is an equally weighted portfolio of stocks in the worst performing 30 percent, portfolio P2 includes the middle 40 percent, and portfolio P3 includes the best performing 30 percent. This table reports the average monthly returns of these portfolios and portfolios formed using an independent sort on Model 1 analyst coverage residuals of log size and a NASDAQ dummy. The least covered firms are in Sub1, the medium covered firms in Sub2, the most covered firms in Sub3. Mean (median) size is in millions. t-statistics are in parentheses.

PAST	Residual Coverage Class				
	ALL STOCKS	Low:SUB1	Medium:SUB2	High:SUB3	SUB1-SUB3
P1	0.00622 (1.54)	0.00271 (0.66)	0.00669 (1.70)	0.00974 (2.31)	-0.00703 (-5.16)
P2	0.01367 (4.40)	0.01257 (4.20)	0.01397 (4.58)	0.01439 (4.29)	-0.00182 (-2.11)
P3	0.01562 (4.35)	0.01402 (3.95)	0.01583 (4.52)	0.01690 (4.45)	-0.00288 (-2.80)
P3-1	0.00940 (4.89)	0.01131 (5.46)	0.00915 (4.64)	0.00716 (3.74)	0.00415 (3.50)
Mean Size		962	986	455	
Median Size		103	200	180	
Mean Analyst		1.5	6.7	9.7	
Median Analyst		0.1	3.5	7.6	

Source: Hong, Lim and Stein, *Journal of Finance* 55(1) 2000:265-295

- As with size effects, the effect of coverage appears to be driven by the behavior of the loser stocks.
- “Loser-analyst spread trade” is possible – long P1/SUB3 against short P1/SUB1 – since their return differential is 0.7% per month and is highly statistically significant (t-statistic is 5.16); this trade is size-neutral and momentum-neutral!

Effect of Analyst Coverage on Momentum

- The intuition behind the fact that the relative lack of analyst coverage affects stocks that are past losers more than stocks that are past winners is the following:

“Think of a firm which has no analyst coverage, but which is sitting on good news. To the extent that its managers prefer higher to lower stock prices, they will push the news out the door themselves, via increased disclosures, etc. On the other hand, if the same firm is sitting on bad news, its managers will have much less incentive to bring investors up to date quickly. Thus the marginal contribution of outside analysts in getting the news out is likely to be greater when the news is bad.”
- Thus the rule of thumb is that low-coverage stocks react more slowly to bad news than to good news.

Combining value and earnings momentum effects

- Based on the foregoing, the factors that are useful in designing a medium-term statistical arbitrage strategy are:
 - Price momentum
 - Earnings and analysts' earnings forecast revisions
 - Value and growth factors
- Because value and growth are long-term factors, they are used first to rank stocks into buy and sell candidates, with value stocks being the former and growth stocks being the latter.
- The value stocks are then further ranked using the various price and earnings momentum variables such as *R6*, *SUE* and *REV6*.
- The growth stocks are also further ranked using the same momentum variables.
- Among value stocks, buy those with positive price and earnings momentum.
- Among growth stocks, sell short those with negative price and earnings momentum.
- It is also straightforward to design a strategy which has no factor loading to value or growth.